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Heart Disease and Cancer Mortality Trends

Part I†

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IN the preliminary report¹ of a survey of the mortality from heart and arterial disease in a 25 year period in Ontario, the uncertainty of reality in the apparent increase was emphasized and the significance of the public health problem of heart disease in younger age groups was indicated. The necessity, in tracing trends, for a realization of the limitations of mortality statistics, for due consideration of changing diagnosis, certification and tabulation, and for reconciling apparent change or lack of change in recorded rates with general knowledge and clinical experience, was stressed.

The conclusion from further examination of the data can be stated very briefly: It is that the evidence in vital statistics is not of a quality to warrant a definite statement that heart disease, or C.V.R.* disease, or cancer, or the total of these mortalities is or is not increasing as a public health problem. The unsatisfactory character of this conclusion is due to the limitations of vital statistics. These limitations should be taken into consideration in analysing the data in vital statistics and in accepting, rejecting or discounting conclusions based on those data. It is trite but true to say that the mortality charged to a specific cause in vital statistics may be far from the mortality which is actually due to that cause and that the discrepancy between the recorded rates and reality may

¹Ross, Mary A.: *Mortality from Cardiovascular-Renal Diseases. Presented at a conference of the Section of Vital Statistics and Epidemiology, Canadian Public Health Association, Toronto, May 5, 1936.*

*C.V.R., used for the sake of brevity, includes diseases of heart, diseases of arteries, apoplexy, cerebral haemorrhage and thrombosis, and chronic nephritis.

†Part II will be published in the May issue.

vary widely both in degree and direction, may not be evident even on close inspection, and never be subject to precise measurement. It is probably greatest in the mortality records of very early life and old age. Even necropsy statistics have their limitations, which must be understood and allowed for in drawing conclusions from them. Every physician realizes that, in reducing the complexity of the cause of death, even when known, often multiple in character, to the necessary simplicity of a few words on a death certificate, there is too often some degree, always variable, of incompleteness or inaccuracy. In the final compilation only one cause can be tabulated. This leads inevitably but unavoidably to further and varying loss of completeness and accuracy. Small wonder that mortality statistics are so lacking in uniformity and therefore in comparability and continuity.

As evidence of some of the limitations of vital statistics, reference is made and consideration given herewith to a few specific examples of the incongruities in the official data of Ontario which have some bearing on the rates under review. It is not implied that such fallacies are confined to the data of this province. Far from it. They are inherent in and, in varying degree, common to all vital statistics. The relationship between the various members of the cardio-vascular-renal group and the overlapping not only within that group but with senility and ill-defined causes, with cancer, with respiratory mortality and with practically all other causes of death in older age groups with consequent loss of accuracy in many of the mortality rates, are discussed before analysing the data.

A Large Abrupt Artefact Simulating Reality

In 1920, 2,616 deaths in those of 70 and over, or a quarter of the 10,460 deaths in that group, were charged to senility with a rate of 2,580 per 100,000. The following year, 1921, only 1,379 deaths or less than 15 per cent. of a lower total mortality in those of 70 and over were so tabulated with a rate of 1,340 per 100,000. One might anticipate that such a large and abrupt decrease in recorded senility would be prominently reflected in abrupt increases in other rates and that the distribution of at least a large part of this change would thus be readily located. But this is not the case. Diseases of the genito-urinary system exclusive of nephritis showed an abrupt increase; so, too, diseases of the digestive tract, but these, in a few years, decreased again. These increases, however, would absorb only a very small part of the difference in recorded senility mortality. The respiratory mortality* rate in the 70-and-over age group in 1921, however, when compared with the total death rate for the age group, appears disproportionately high. The lack of evident excess in total mortality in that year gives rise to some doubt that there was actually as much epidemic respiratory infection in 1921 as would be suggested by the recorded respiratory mortality rate. It is a reasonable assumption therefore, though by no means a certainty, that at least some of the recorded rate of respiratory mortality in 1921 was due to a shift from senility. The C.V.R. rate in the age group of 70 and over was higher in 1921 than in 1920, in spite of the fact that the total death

*Throughout the paper the term respiratory mortality or mortality from respiratory disease includes that charged to influenza.

rate was lower. While there is no doubt that individual cases have been thrown subsequently into the C.V.R. mortality by the effect of influenza and other acute infections on the C.V.R. system, the more reasonable explanation of the high C.V.R. rate in 1921 is that the excess was due in some part to a shift from the senility category, although the data in this particular instance do not give very obvious and unequivocal support to this contention.

The fact that other causes of death could so readily absorb such a large volume of mortality in one year without showing evident increases in themselves, indicates at once the uncertain and deceptive quality of recorded rates and shows the impracticability of detecting or assessing the significance of smaller mortality changes. This demonstrates, perhaps better than any other example, the necessity for subjecting apparent changes, or lack of change, to adequate test and for checking the relationship to other specific rates, to total mortality rates and to general knowledge and clinical experience before assessing them as real or attributing them to specific factors. This is especially true of changes in C.V.R. and cancer rates.

Fallacy Revealed by Abrupt Fluctuations

Examination of table I shows abrupt changes, decreases or increases, in many rates from year to year. Some of these changes are beyond the bounds of reasonable chance variation; some are within those limits but neither necessarily, nor with any likelihood, really due entirely to pure chance. They are the product of many variables: chance; changes in diagnosis, certification and tabulation without any real change in the mortality; the influence of the amount of mortality in the year or short period immediately preceding; the influence, fictitious or real, of real changes in other mortality; finally, actual changes in factors producing the mortality. The artificial influences are much more subject to abrupt change and are much more potent in producing such changes in the recorded rates than are the factors which effect a real change in mortality.

For instance, the increase in heart disease from 1,700 in 1922 to 1,965 in 1923, in arterial disease from 1,470 in 1927 to 1,620 in 1928, the decline in apoplexy from 1,010 in 1923 to 880 in 1924, in nephritis from 650 in 1930 to 550 in 1931, the increase in cancer from 646 in 1919 to 731 in 1920, from 956 in 1932 to 1,105 in 1933, the whole series of erratic changes in ill-defined causes, the increase in diabetes from 89 in 1926 to 116 in 1927, the decrease in rheumatism and gout from 52 in 1924 to 27 in 1925, the decrease in anaemia from 144 in 1925 to 97 in 1927, the increase in diseases of the genito-urinary system from 221 in 1920 to 310 in 1921, in diseases of the digestive system from 332 in 1920 to 484 in 1921 and the decrease again in 1923 to 364; neither any of these changes nor others like them carry conviction of reality. The fluctuations are not in keeping with the present concept of the nature of such diseases or conditions. The factors which account for these mortalities, in reality, are not subject to such rapid change, neither is the reaction of the population in which such factors operate. Even the extreme variation in mortality from external causes, from 191 in 1919 to 279 in 1920, beyond probable chance variation as it is, is more likely due, in

TABLE I
AGE SPECIFIC MORTALITY RATES, RATES PER 100,000. AGE GROUP 70 YEARS AND OVER

Classification	1911	1912	1913	1914	1915	1916	1917	1918	1919
1. Heart disease.....	1000	1120	1175	1230	1330	1410	1530	1490	1335
2. Arterial disease.....	706	810	780	730	870	840	870	1000	920
3. Cerebral haemorrhage.....	904	900	1000	1090	1130	1220	1148	1117	1100
4. Nephritis.....	314	304	417	395	449	405	388	378	336
5. C. V. R. (1, 2, 3, 4).....	2924	3134	3372	3445	3779	3875	3936	3985	3691
6. Cancer.....	548	585	602	660	658	610	657	623	646
7. Senility.....	3970	4050	3200	2800	2800	2660	2700	2440	2320
8. Ill-defined causes.....	18	46	16	31	34	29	13	14	122
9. Total 5, 6, 7 and 8.....	7460	7815	7190	6936	7271	7174	7306	7062	6779
10. External causes.....	238	211	258	216	212	248	242	218	191
11. Typhoid fever.....	18	14	8	14	13	5	2	6	3
12. Tuberculosis.....	110	80	73	81	94	90	93	83	77
13. Diabetes.....	55	58	51	52	69	58	79	76	71
14. Rheumatism and gout.....	64	76	74	51	51	57	55	54	36
15. Anaemias.....	100	91	104	98	108	124	112	107	90
16. Respiratory including influenza..	1088	956	1210	1028	1395	1650	1530	1282	978
17. G.U. system exclusive of nephritis	148	160	160	134	172	185	161	152	198
18. Digestive system.....	303	275	337	306	320	320	319	294	324
19. Miscellaneous.....	266	294	365	364	395	389	381	346	333
20. Total mortality.....	9850	10030	9830	9280	10100	10300	10280	9680	9080

Classification	1920	1921	1922	1923	1924	1925	1926	1927	1928
1. Heart disease.....	1540	1510	1700	1965	1760	1870	2280	2220	2300
2. Arterial disease.....	1260	1200	1370	1310	1460	1540	1520	1470	1620
3. Cerebral haemorrhage.....	985	1040	1120	1010	880	850	817	770	790
4. Nephritis.....	314	367	360	436	496	562	625	610	630
5. C. V. R. (1, 2, 3, 4).....	4099	4117	4550	4721	4596	4822	5242	5070	5340
6. Cancer.....	731	811	770	835	869	869	922	855	908
7. Senility.....	2580	1340	1180	1240	1070	745	590	522	483
8. Ill-defined causes.....	67	68	25	35	67	73	90	55	66
9. Total 5, 6, 7 and 8.....	7477	6336	6525	6831	6602	6509	6844	6502	6797
10. External causes.....	279	350	319	334	316	338	364	345	402
11. Typhoid fever.....	3	8	3	4	5	3	2	2	3
12. Tuberculosis.....	63	86	89	64	75	59	75	70	56
13. Diabetes.....	55	54	80	89	82	88	89	116	110
14. Rheumatism and gout.....	56	76	65	53	52	27	23	28	21
15. Anaemias.....	123	124	132	132	122	144	128	97	85
16. Respiratory including influenza..	1410	1320	1580	1820	1020	1190	1430	1040	1292
17. G.U. system exclusive of nephritis	217	310	274	280	308	354	359	294	318
18. Digestive system.....	332	484	476	364	411	389	345	355	305
19. Miscellaneous.....	345	432	357	359	337	399	431	391	401
20. Total mortality.....	10360	9580	9900	10330	9330	9500	10090	9240	9790

Classification	1929	1930	1931	1932	1933	1934	1935
1. Heart disease.....	2300	2147	2061	2427	2390	2490	2521
2. Arterial disease.....	1610	1760	1560	1760	1740	1850	1979
3. Cerebral haemorrhage.....	674	630	543	539	518	526	420
4. Nephritis.....	642	650	550	615	586	560	621
5. C. V. R. (1, 2, 3, 4).....	5226	5187	4714	5341	5234	5426	5541
6. Cancer.....	890	917	972	956	1105	1048	1068
7. Senility.....	456	397	398	374	336	323	318
8. Ill-defined causes.....	41	21	36	33	23	21	16
9. Total 5, 6, 7 and 8.....	6613	6522	6120	6704	6698	6818	6943
10. External causes.....	354	377	382	365	336	413	445
11. Typhoid fever.....	3	1	6	1	1	1	1
12. Tuberculosis.....	56	62	64	66	54	57	55
13. Diabetes.....	111	110	126	142	145	136	143
14. Rheumatism and gout.....	19	28	28	25	21	20	22
15. Anaemias.....	100	103	108	109	110	103	114
16. Respiratory including influenza..	1434	876	1020	1274	1120	910	1050
17. G.U. system exclusive of nephritis..	280	270	273	286	288	302	350
18. Digestive system.....	330	376	339	342	340	337	355
19. Miscellaneous.....	400	435	334	336	297	353	312
20. Total mortality.....	9700	9160	8800	9650	9410	9450	9790

part at least, to an artefact, a change in certification or tabulation, and some of it to chance, than to an actual 50 per cent. increase in this mortality in one year. These wide fluctuations, certainly fictitious in themselves, reflect the general unreliability of the rates in which they occur.

The sudden changes in the rates of respiratory mortality, however, are in keeping with our understanding of the epidemic nature of the causes of much of this mortality, but the differences indicated by the figures do not reflect with any accuracy the real differences in mortality from year to year. It will be noticed that peaks in respiratory mortality are often associated with peaks in many other mortalities. The excesses in the other mortalities are undoubtedly due to the excess in epidemic respiratory infection although it does not show as such in vital statistics. Even a variation in the specificity of certification, e.g. pneumonia, unspecified, instead of pneumonia, lobar, in association with another cause, may determine the classification of the death in an entirely different category, a change with which the certifying physician might not agree. The unreliability of the fluctuations in respiratory mortality rates and of the rates themselves and their influence on other mortality rates is not difficult to understand. Uncertainty in respiratory mortality and overlapping with C.V.R. and both of these with practically all other mortality in later life is inevitable. It is in keeping with human limitations and with the complexity of death. It is in this uncertainty in the figures rather than in the figures themselves that the truth lies. A physician may, depending on his training, his perception, his mood, and his environment especially in regard to the presence or absence of respiratory infection in recognized epidemic proportions, give a coincident respiratory infection a major or minor place on a death certificate where another physician, or the same physician at another time, may withhold all record of it. It is so, too, with most other multiple causes. Even the mortality charged to accidental causes is not in reality free from the varying influences of other attendant conditions.

The Relationship of Senility and Ill-Defined Mortality to C.V.R. and Cancer

It is common knowledge that the diagnoses, heart disease, arterial disease, chronic nephritis, hypertension and apoplexy, are so interrelated and overlap to such an extent that they are best considered as a group, the cardio-vascular-renal group (C.V.R.). It is common knowledge, too, perhaps too common, that the recorded mortality rates of heart disease and cancer have increased to high levels in recent years. If it is not common knowledge, it must be recalled as already indicated that very few deaths are now charged to senility and ill-defined causes including sudden death, in comparison with the very large volume of mortality of later life previously charged under these headings. There is no doubt that the type of death which was formerly charged under these headings is, for the most part, charged now to the C.V.R. group and cancer. But as to precisely what large part should be so reallocated at different periods or in what exact proportion between C.V.R. and cancer, vital statistics can add little to speculation and conjecture. The fact that the recorded increases in the C.V.R. group more nearly, though by no means exactly, approximate in time and extent

the decreases in senility and ill-defined than do the increases in cancer mortality, which were much more regular and smaller, signifies little, and by no means permits the exclusion of cancer in reallocation of senility and ill-defined deaths. The reasonableness of allotting some of this mortality to cancer is plainly evident when it is realized that by far the larger part of the recorded increase in cancer mortality in the past 25 years has been in cancer of the stomach, intestines and liver, the hidden sites, exploration of which by X-ray, biopsy, and even necropsy has been largely a development of that time. To reallocate the senility and ill-defined mortality to C.V.R. and cancer *pro rata* would be taking unwarranted liberties with the figures and any other distribution in definite proportions between C.V.R. and cancer would be simply adding uncertainty to that already existing. Further inaccuracy is therefore avoided by using the sum of these mortalities throughout the period for comparison.

It will be obvious, of course, that in reallocating all senility and ill-defined deaths (in older age groups) to the C.V.R.-cancer rates, complete correction is not implied. Pneumonia, as already indicated, the anaemias, prostatic disease, diseases of the bladder, disease of the digestive tract, diabetes, diseases of the nervous system, and indeed what not, probably have been or are being charged with some of these deaths, but such transfers cannot be satisfactorily identified, much less measured. As will be shown in analysis of the data, the numbers that might be involved in certifications other than C.V.R. and cancer are small in comparison with the numbers involved in these two groups so that if conclusions are not drawn from too small differences, they are not invalidated by allowing for a distribution of some indefinite part of this mortality to other causes. There is no doubt whatever that by far the larger part of this volume of mortality (senility and ill-defined) should be reallocated to that of C.V.R.-cancer.

The propriety of charging deaths in old age to heart disease and arterial disease instead of to senility may be questioned. Specific diagnosis justifies its certification, but many will question whether arterial disease and heart disease, under which classifications nearly half of all mortality even in those over 90 years of age is tabulated, carry in reality any more specificity than senility or old age. In 1935 only 11 per cent. of mortality over 90 years of age was tabulated under senility.

It is from data which hold the uncertainties and fallacies cited and many similar, and many too that are not even revealed by the figures, that conclusions in regard to the reality of the increase in mortality from heart and arterial disease and cancer are to be drawn. To derive certainty in conclusions from such uncertain data would be hazardous. The uncertainties indicated explain the necessity for reservations in interpreting practically any recorded rate of mortality of later life.

Food Consumption of Twenty-Nine Families in Edmonton, Alberta

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ANDREW STEWART, B.S.A., M.A.†

IN connection with an investigation into food purchases of Edmonton families, being conducted at the University of Alberta, it was decided to supplement the record of food purchases of a group of low-income families, by weighing the stocks of food on hand at the beginning and end of the recording period. In relation to the larger study, the primary purpose was to test the extent to which records of food purchases might serve to indicate the consumption of food by groups of families. Although the number of families is relatively small, the results of the analysis of consumption may however be useful in suggesting the nature and extent of dietary deficiencies among relatively low-income families in Edmonton. *At the same time, because of the small number of families, care must be taken not to impute too great significance to the results.*

Owing to the somewhat greater measure of co-operation on the part of the housewife required in obtaining inventory data, the method of contact employed in the study of food purchases failed to provide sufficient families. Additional families were secured through the co-operation of public health nurses of the city of Edmonton, and the Edmonton Branch, Victorian Order of Nurses. Families in receipt of relief were purposely excluded and the upper limit of family income was set at \$1,500 per year. Table I indicates for each of the 29 families the annual income, family composition, income per adult unit per week, and food cost per adult unit per week. The caloric requirements set out in the Canadian Dietary Standard (1) were used in determining the adult units.

This sample could only be representative of families within the range of income taken, i.e. from \$500 to \$1,500. It is obviously important to know whether the sample of 29 families is representative of families, in general, within this income range. No satisfactory answer is possible. In connection with the study of food purchases by Edmonton families, two larger samples of families have been obtained independently of each other. The averages of the families in these two samples and for the 29 families are as follows:

	Number of families	Average number of adults	Average number of children*	Average number of persons
1936	128	2.74	1.25	3.99
1938	110	2.66	1.24	3.90
1938	29	2.38	1.72	4.10

*Sixteen years and under.

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†Assistant Professor of Political Economy, University of Alberta.

TABLE I
INCOME, FAMILY COMPOSITION, INCOME AND FOOD COST PER ADULT UNIT PER WEEK

Family No.	Annual income	Family Composition				Income per adult unit per week	Food cost per adult unit per week
		Adults	Children	Adult units			
1	\$1152	3	8	8.94*	8.65†	\$2.48*	\$1.68†
2	660	2	5	5.07	5.05	2.50	2.90
3	728	3	5	5.52	5.83	2.54	1.63
4	720	2	3	4.68	4.68	2.96	1.14
5	1344	3	6	6.97	6.67	3.71	1.46
6	500	2	2	2.54	2.25	3.79	2.81
7	720	2	2	3.63	3.70	3.81	1.53
8	984	2	4	4.81	4.66	3.93	2.55
9	500	2	—	2.04	2.04	4.71	2.70
10	800	2	1	2.54	2.25	6.06	2.70
11	840	2	2	2.63	2.31	6.14	2.42
12	960	3	—	2.72	2.43	6.79	3.32
13	1080	2	2	3.04	3.07	6.83	2.70
14	1500	4	1	4.18	4.98	6.90	2.77
15	1020	3	—	2.72	2.47	7.21	4.21
16	1200	3	—	3.15	2.43	7.33	3.09
17	900	2	1	2.33	2.05	7.43	2.64
18	1200	3	1	3.07	3.20	7.52	2.63
19	1200	2	2	3.04	2.78	7.59	2.71
20	1200	3	—	2.75	2.75	8.39	2.75
21	1500	2	2	3.40	3.53	8.48	2.92
22	960	2	—	2.04	2.25	9.05	3.51
23	1140	2	1	2.36	2.76	9.29	2.11
24	1200	3	—	2.43	2.69	9.50	3.70
25	1200	2	1	2.33	1.91	9.90	3.30
26	960	2	—	1.86	2.26	9.93	3.39
27	1464	2	1	2.61	2.74	10.79	6.16
28	1250	2	—	1.86	1.77	12.92	4.15
29	1200	2	—	1.72	1.35	13.42	4.16
Total	30082	69	50	96.98	95.51	201.90	83.74
Average	1037	2.38	1.72	3.34	3.29	6.96	2.89

*Adult units based on the number of persons living in the home.

†Adult units based on the number of meals taken in the home during the week, by members of the family and by guests.

This suggests that, with respect to family composition and income per adult unit, the sample might be reasonably representative of the larger population. It is possible that with respect to other characteristics affecting food consumption the sample is less representative, but no means of testing this is available.

As already indicated, the data were obtained from records of family food purchases supplemented by the weighing of food inventories. The period covered by each record was one week; collection of records being carried out in May and June, 1938. At the outset the stocks of food on hand were weighed, using balance scales which permitted accurate recording to within one-half ounce. The return visit was made at the same time of day one week later. In the interval the housewife kept a record of all food purchased. At the return visit the stocks of food were again weighed, and at this time the record of purchases was checked and other sources of food noted. The family consumption was obtained by adding together the stocks on hand at the beginning, food purchases, gifts, etc., and deducting the closing stocks. *The consumption data represent the disappearance of food available to the family. The measured consumption will, therefore,*

exceed the actual consumption by the quantities "wasted", i.e. quantities, other than refuse, not actually eaten.

The measured consumption for each family was then separately analyzed. For this purpose the values given by Rose (2) were largely used, being supplemented where necessary by data from Waller (3), and from Dr. E. W. McHenry, University of Toronto. In determining the requirements for individual families, adjustments were made for the number of meals served to each member of the family and for guests. The requirements were computed on the basis of the Canadian Dietary Standard and in consultation with Dr. McHenry.

The average consumption and average requirements per family per week are shown in table II. The average consumption of calories, fat, protein, and phosphorus was in excess of calculated requirements. The amount of protein from animal sources considerably exceeded the prescribed one-third of total protein. Deficiencies, for the families as a group, were recorded by the averages for calcium and iron.

The variations in intake were considerable for all elements. The majority of families secured sufficient calories, fat and phosphorus. In the case of calcium and iron, 17 and 14 families obtained more-than-standard amounts. Other significant features are the marked deficiencies of some families in calcium and iron, and the surprising excesses obtained by a few families in the case of each of the important elements. Considering only calories, calcium and iron, the combinations of deficiencies are as follows:

Calories only	1	Calories and iron	2
Calcium only	1	Calcium and iron	5
Iron only	2	Calories, calcium and iron	6

All six of the families deficient in calories, calcium and iron were also deficient in protein, and four of them were deficient in phosphorus.

For the six families with deficiencies in calories, protein, calcium and iron, the average income was \$4.78 per adult unit per week, and the average food cost \$2.00 per adult unit. On the other hand, there were twelve families whose consumption of calories, protein, calcium, phosphorus and iron was adequate. The

TABLE II
AVERAGE CONSUMPTION AND AVERAGE REQUIREMENTS PER FAMILY PER WEEK

	CONSUMPTION	REQUIREMENTS	Difference between consumption and requirements			
			Amount		Per cent.	
			plus	minus	plus	minus
Calories	72,851	64,543	8308	—	12.9	—
Fat (grams)	2,851.1	2,151.4	699.7	—	32.5	—
Protein						
animal (grams)	1,204.2	827.5	376.7	—	45.5	—
plant (grams)	984.9	1,186.7	—	201.8	—	17.0
total (grams)	2,189.1	2,014.2	174.9	—	8.7	—
Calcium (grams)	21.65	22.97	—	1.32	—	5.7
Phosphorus (grams)	36.34	31.54	4.80	—	15.2	—
Iron (grams)	0.364	0.391	—	0.027	—	6.9

average income per adult unit for these families was \$8.88 per week, and the average food cost \$3.64. Eight of these twelve families had income per adult unit above the general average for the group (\$6.96), and nine of them had food costs above the average (\$2.89).

Further indication of a significant relation between family income, in terms of the physical needs of the family, and the adequacy of the family diets can be provided. When the families are grouped according to income per adult unit per week, the average intake of each of the nutritional elements increases with increasing income. The distribution of families between those securing adequate and those obtaining deficient diets at each level of income, also reflects more adequate diets at higher income levels. At the lowest level of income, namely \$2—\$5 per adult unit per week, the average consumption is adequate for calories and phosphorus, but deficient for protein, calcium and iron. Most of the families in this group were deficient in these two minerals. While some of the families in the higher income-groups showed deficiencies in one or more elements, the averages for these groups were above-standard for all elements measured.

The adequacy of diets is also directly related to food costs, i.e. the value of food consumed. The average intake of calories, protein, calcium, phosphorus and iron, and the relative number of families with adequate consumption, increase with increasing food cost. For families spending from \$1—\$2 per adult unit per week on food, the average consumption of the various elements was in each case less-than-standard. Above this level of food cost, the averages indicate adequacy in all elements except iron.

To obtain any clear indication of the effect, on family consumption, of the number of children in the family it would be necessary to eliminate the variations due to income differences. This might be accomplished by comparing the consumption of families with substantially the same income per adult unit but with varying numbers of children. Analysis of the data on this basis was attempted, but as might be expected, the number of families was too small to yield significant results. In table III the families are grouped according to the number of children and without regard to income. Consequently the relations established by this table do not represent the effect of family composition alone. However, it may be significant that the average consumption of each of the nutritional elements was above requirements for the families without children. In the case of families with one child, the average iron intake was slightly less than standard. For families with two children, some deficiency in both calcium and iron was recorded. The data indicate more general and pronounced deficiency conditions for families with more than two children. The general conclusion would appear to be that at the level of incomes studied, families with more than two children are likely to obtain appreciably deficient diets. Even among families with one or two children, mineral deficiencies are likely to be prevalent.

Although the analysis indicates that significant relations exist between income, food cost, composition of the family and the adequacy of diets, there is also substantial evidence of the importance of other factors. This can perhaps best be illustrated by referring to particular cases (table IV).

TABLE III
RELATION BETWEEN FAMILY COMPOSITION AND FOOD CONSUMPTION

Number of children	Number of families	Per cent. difference between consumption and requirements									
		Calories		Protein		Calcium		Phosphorus		Iron	
		deficient	adequate	deficient	adequate	deficient	adequate	deficient	adequate	deficient	adequate
0	10	%	%	%	%	%	%	%	%	%	%
1	7	—	33.7	—	27.9	—	43.7	—	38.0	—	29.3
2	6	—	17.5	—	23.0	—	22.8	—	22.3	3.7	—
3	1	—	10.8	—	4.3	—	4.9	—	12.7	12.3	—
4	1	18.8	—	23.8	—	54.4	—	18.7	—	33.0	—
5	2	—	2.5	6.3	—	18.3	—	—	8.7	19.6	—
6	1	8.4	—	9.7	—	25.0	—	2.7	—	30.7	—
7	0	—	12.2	—	11.1	47.7	—	—	13.0	—	3.2
8	1	—	7.6	14.0	—	41.3	—	5.0	—	31.3	—

TABLE IV
FOOD DEFICIENCIES IN SPECIAL FAMILIES

Family No.	Income per adult unit	Food cost per adult unit	Deficiencies				
			Calories	Protein	Calcium	Phosphorus	Iron
9	\$ 4.71	\$ 2.70	%	%	%	%	%
13	6.83	2.70	—	—	—	—	—
14	6.90	2.77	—	—	—	—	—
18	7.52	2.63	—	17.4	31.5	24.8	32.4
19	7.59	2.71	11.5	16.4	4.9	—	36.3
23	9.29	2.11	20.3	25.0	21.9	24.8	36.9

Families 9, 13 and 14 are relatively low-income families with relatively low food costs, but receiving adequate diets. The other three families secured seriously inadequate diets. Of these families 18 and 19 have somewhat higher incomes and about the same expenditure on food as the first three families. On the other hand, family 23 has a relatively high income per adult unit but low food costs. In the cases of families 18, 19 and 23, it is probable that with increased knowledge of nutritional requirements and of the nutritional content of foods, along with more skilful management, a larger measure of adequacy in diets would be achieved.

Milk is an important source of calcium. For the 29 families as a group, 63 per cent. of the calcium consumed was obtained from milk alone and 72 per cent. from milk and milk products. The Canadian Dietary Standard suggests the consumption of certain quantities of milk. In order to test the effectiveness of these recommendations, the families were grouped according to the percentages of these standards actually consumed. As will be apparent from table V, there is a pronounced direct relation between the amount of milk consumed, relative to the standards prescribed, and the calcium consumption. Thirteen out of 17 families taking less milk than prescribed secured inadequate quantities of calcium.

TABLE V
RELATION BETWEEN MILK AND CALCIUM CONSUMPTION

	Number of families		MILK	CALCIUM
	deficient	adequate	Per cent. difference between consumption and standard	Per cent. difference between consumption and standard
Families consuming less than standard milk	3	—	—50% to —75%	—47.8%
	5	3	—25% to —50%	—9.3%
	5	1	—0% to —25%	—1.8%
Families consuming more than standard milk	—	2	+0% to +25%	+14.0%
	—	2	+25% to +50%	+38.5%
	—	3	+50% to +75%	+69.6%
	—	2	+75% to +100%	+27.0%
	—	1	+100% to +125%	+101.7%
	—	1	+125% to +150%	+99.6%
	—	—	+150% to +175%	—
	—	1	+175% to +200%	+113.3—

On the other hand, none of the families consuming more than the standard quantities of milk obtained a diet deficient in calcium.

It has been suggested by Sherman (4) that, in order to obtain an adequate diet, it is advisable to distribute the purchases of food in such a way as to secure at least 50 per cent. of the total caloric requirements from the protective foods, namely, milk and milk products, fruits, vegetables, and eggs. Table VI indicates that the degree of adequacy of the diet is directly associated with the proportion of caloric requirements obtained from the protective foods, and supports the suggestion of Sherman.

However, the protective foods tend, in general, to be relatively expensive in terms of the calories they provide. Thus for the 29 families in this study, the cost per 100 calories obtained from protective foods was 1.66 cents; the cost per 100 calories from other sources, 0.98 cents.* Consequently limitations of income may make it difficult for low-income families to secure a sufficient quantity of the protective foods to ensure adequacy. Further analysis indicates that the low-income families in this group obtained their calories from relatively cheap energy and protective foods. For the 9 families with income per adult unit ranging from \$2—\$5, the average cost per 100 calories from protective foods was 1.53 cents; the cost per 100 calories from other sources, 0.74 cents.

The relation between value of food consumed (food costs) and the adequacy of diets has been discussed above. The value of food consumed exceeds the amount spent on food consumed. In the first place, some quantities of home-grown garden produce were used. The amount of such produce available either from stocks or from the garden is relatively small in May and June. A few families used small quantities of fresh rhubarb. Where foods, for example potatoes, were consumed out of stocks on hand it was not established whether

*The average cost per 100 calories from all sources was 1.24 cents. Thirty-nine per cent. of the total calories were obtained from protective foods, 61 per cent. from other sources.

TABLE VI
ADEQUACY OF CONSUMPTION AND PROPORTION OF CALORIES FROM "PROTECTIVE"* FOODS

ALL ELEMENTS†					MINERALS ONLY				
Number of deficiencies	Av. per cent. of calories from protective foods	No. of families			Deficient in	Av. per cent. of calories from protective foods	No. of families		
		Total	Less than 50%	More than 50%			Total	Less than 50%	More than 50%
None	55%	12	4	8	None	54%	13	5	8
One	53	3	2	1	Calcium only	47	1	1	—
Two	46	5	3	2	Iron only	49	4	2	2
Three	43	1	1	—	Calcium and iron	45	5	4	1
Four	39	4	4	—	Calcium, phosphorus and iron	34	6	6	—
Five	33	4	4	—					

*Milk and milk products, fruits, vegetables, and eggs.

†Calories, proteins, calcium, phosphorus, iron.

these stocks were acquired by purchase, from gardens, or from other sources. Consequently it is impossible to determine the actual extent to which gardens contributed to consumption.

In the second place, during the recording week, seven families received and consumed food from other sources, namely, gifts (principally milk), fish caught, and eggs. The additional food secured from these sources was, in some instances, sufficient to make the difference between adequacy and deficiency.

ACKNOWLEDGMENTS

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Survey of Rocky Mountain Spotted Fever and Sylvatic Plague in Western Canada during 1938*

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TWO diseases, Rocky Mountain spotted fever and sylvatic plague, have been the subject of an investigation initiated in Canada during 1938. As these infections are primarily diseases of wild rodents, a field study permits of the concurrent investigation of these two diseases. This paper presents the findings of the surveys made in 1938.

Sylvatic plague is the term now generally used in referring to infection of wild rodents by *Pasteurella pestis*. Most of the observers are of the opinion that the west coast of North America became infected in the course of the plague pandemic of 1894, which originated in Hong Kong and reached America at least by 1900. Wild rodents probably became infected through contact with domestic rats and the infection has spread until it is now present in nine of the western states, including Washington, Idaho and Montana, which border on the provinces of British Columbia and Alberta. The history of the progress of the infection northward and eastward through the western section of the United States forces us to consider that the infection may have extended to Western Canada, or if not, may be expected to do so within the next few years.

Rocky Mountain spotted fever, a specific infectious disease, which was first described in the Rocky Mountain region of north-western United States, was thought until comparatively recently to be limited to that region. However, the disease is now known to be endemic in 39 of the 48 states (1) and Dyer in 1937 (2) stated that "the number of cases reported each year since the recognition of the fact that the disease is widely distributed over the United States has remained at a figure a little short of 1,000 cases." The first case officially reported in Canada was in 1935 and since then eight more cases have been reported.

The clinical picture of the so-called typical case of Rocky Mountain spotted fever is that of an acute enanthem with accompanying toxæmia, but variations from mild ambulatory forms to hæmorrhagic and fulminating types occur. The case-fatality rate varies from as low as 5 per 100 cases to as high as 80, but is usually fairly constant in a given locality. The etiological agent, *Rickettsia dermacentroxenus*, is transmitted by several species of ticks. Two of these, *Dermacentor andersoni*, the Rocky Mountain wood tick, and *Dermacentor*

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variabilis, the American dog tick, are proved vectors in the transmission of the disease to man. The former is responsible for the cases in Western United States, while the latter is the vector in the Eastern States. Both of these ticks are found in Canada. The Rocky Mountain wood tick is abundant in the dry-belt areas of British Columbia and throughout Southern Alberta and south-western Saskatchewan. There are also isolated records of its occurrence in Manitoba. The American dog tick is found in Manitoba, parts of Saskatchewan and in a few districts in Ontario. It has been reported also in Labrador.

The survey concerning these two diseases is a co-operative project between the Department of Pensions and National Health and the Health Departments of the provinces of Alberta and British Columbia. The Department of Pensions and National Health undertook the organization of the survey and the provision of advisory personnel who remained in the field throughout the course of the study. The Provincial Departments, which were assisted by grants from the International Health Division of the Rockefeller Foundation, provided all the equipment and each supplied a crew of two men to carry out the field work. Throughout the survey the Dominion Department of Agriculture through its Entomological Division gave active assistance to the project. The work of the survey was arranged as follows:

Rocky Mountain Spotted Fever: (1) Collection of epidemiological and statistical data to determine the actual prevalence of the disease in Canada. (2) Collection and laboratory examination of ticks to determine: areas infested by ticks, density of tick infestation, and the season of tick activity; areas in which ticks are infested with *Richettsia dermatocentroxenus* and the virulence of such infection.

Sylvatic Plague: Collection and examination of wild rodents together with their ectoparasites to determine: areas of wild rodent infestation and the density of the rodent population; species of fleas infesting rodents and the flea indices; location of areas, if any, in which rodents and rodent ectoparasites are infected with *P. pestis*.

Rat Plague: Collection and examination of domestic rats and their ectoparasites in the seaports of Vancouver and New Westminster to determine: species of rats infesting these seaports; flea species harboured by rats and the flea index; presence or absence of *P. pestis* in the rats and their ectoparasites.

All the reports of Rocky Mountain spotted fever at the Provincial Health Departments, the Rocky Mountain Laboratory in Hamilton, Montana, and other agencies were carefully scrutinized. In addition, during the field survey the local medical officers of health, practitioners and others who might give useful information were interviewed. As a result unreported cases were found and evidence was obtained of the occurrence of cases which had escaped diagnosis. While the first case had been reported from Alberta in 1935 and from British Columbia in 1936, it was found that fully authenticated cases had occurred as early as 1923 in Alberta and 1917 in British Columbia. Further, the evidence obtained would suggest that Rocky Mountain spotted fever had been endemic in the western provinces for some time before the first cases were recognized.

In view of the situation, the Alberta field-crew devoted a larger percentage of their time to investigations of Rocky Mountain spotted fever, while in British Columbia the time was divided approximately equally between Rocky Mountain

spotted fever and plague. The number of specimens collected for examination for *P. pestis* and Rocky Mountain spotted fever infection is shown in tables I and II.

TABLE I
SPECIMENS COLLECTED FOR EXAMINATION FOR *P. PESTIS* INFECTION

	Type of rodent	Number of rodents	Number of fleas
Alberta	Ground squirrels	821	1,995
British Columbia	Ground squirrels	2,644	3,672
	Marmots	87	1,767
	Miscellaneous	17	148
	Rats (Norv.)	1,256	1,172
	Rats (Ratus)	6	0
	Rats (Alex.)	15	6
		4,025	6,765
Total		4,846	8,760

TABLE II
TICKS COLLECTED FOR EXAMINATION FOR ROCKY MOUNTAIN SPOTTED FEVER INFECTION

	Type of specimen	Number of specimens
Alberta	Drag ticks	20,199
	Host ticks	691
		20,890
British Columbia	Drag ticks	7,022
	Host ticks	1,633
		8,655
Total		29,545

Drag tick: A flat or unengorged tick collected by the technique of dragging over the vegetation.

Host tick: An engorged tick collected from an animal host, the tick having engorged itself with blood from the host.

During the season of 1938 the laboratory examination of specimens for *Richettsia dermatroxenus* was done at the Rocky Mountain Laboratory, Hamilton, Montana, and those for *P. pestis* at the George Williams Hooper Foundation, San Francisco. For this assistance the Department is deeply indebted to Dr. R. R. Parker, Director of the Rocky Mountain Laboratory, and to Dr. K. F. Meyer, Director of the George Williams Hooper Foundation. The Department of Pensions and National Health has under construction at Kamloops, B.C., a laboratory to carry on this and other laboratory investigations in Canada.

Plague infection was not found in the 3,569 wild rodents and 7,582 rodent

fleas examined. While this is encouraging to the public health authorities it does not warrant a relaxation of vigilance. Failure to encounter infection during any one season or seasons does not preclude the presence of *P. pestis*. It has been the experience of American investigators (3) and others that in known endemic areas demonstrable infection in wild rodents is often periodic in appearance. Further, in areas in which plague is detected only a small percentage of the rodents may be found infected, and it is probable that any acutely-ill animals remain in the burrows and die therein. Repeated and generous sampling of the rodent population is, therefore, necessary both to locate any foci which may already exist and to determine any future migration of infection into Canada.

In Vancouver and New Westminster, 1,277 rats were examined. From these 1,178 fleas were obtained giving a total-flea index of 0.91 of which the cheopis would form only a part. The cheopis index would definitely fall below the critical index of 1.0. Since in most instances the rats were placed in sealed paper bags soon after they were killed, there were probably few fleas lost. *Ratus norvegicus* constituted 98.6 per cent. of all rats collected. *P. pestis* was not found in any of the rats or rat fleas.

None of the ticks tested for Rocky Mountain spotted fever showed definite evidence of infection, though large numbers were collected in the immediate vicinity where cases had occurred. One lot of ticks collected near Kelowna, B.C., gave a test suggestive of a low-grade immunizing infection but, in the opinion of Dr. R. R. Parker, the findings were not sufficiently definite to record a positive result. Here, as in the case of sylvatic plague, negative findings must be interpreted with caution. The American investigators have shown that the percentage of ticks which carry infectious virus varies in different localities and from year to year even in the same locality. Parker (1) states that local tick populations which have shown 3 per cent. to be infectious one year have the next year failed to show evidence of a single infected tick. Further, even the large number of ticks collected represents only a very small percentage of the tick population in the districts surveyed. It will, therefore, be necessary to examine these areas over several seasons before definite conclusions can be drawn.

In the course of the laboratory examination of ticks for Rocky Mountain spotted fever several specimens were found to be infected with virulent strains of *P. tularensis*. These included ticks collected in both south-eastern and south-western Alberta, in the Kootenay district in British Columbia and in north-central British Columbia at Vavenby, B.C. This widespread dissemination of *P. tularensis* in Western Canada is reflected in the 17 human cases of tularemia reported from Alberta and 3 cases in British Columbia.

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The Department of Health and the Practising Physician*

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AS part of this symposium on the relation of the department of health to the community (it is my purpose to speak of the assistance that the department may give to the practising physicians. The fact is recognised that the success of departments of health depends on the co-operation of the physicians of the community. The department in turn can be of great assistance to the physicians.)

THE PRACTISING PHYSICIANS AND THE MEDICAL OFFICER OF HEALTH

As the executive officer of the board of health, the medical officer of health is responsible for the carrying out of the provisions of the Public Health Act and Regulations, as well as local municipal by-laws in regard to health. He is given by statute a great deal of judicial authority and is required to do many things that the general practitioner cannot legally do. However, in regard to his work in general, the medical officer of health must determine whether or not the condition involved has, or may have in the future, any effect on the health of the public. If not, the medical officer has no more jurisdiction than has any private physician. It is true that some medical officers of health are over-zealous and may exceed their authority. On the other hand, there are health officers who shirk their responsibilities by refusing to help the local physician when it is a duty to do so. Usually, however, we find that the wise health officer is not only willing and anxious to assist the general practitioner whenever possible but he will often go out of his way to assist the physicians in his municipalities, especially in regard to work that involves the prevention or control of disease.

In the last decade or so, public health work has become a speciality in medicine. In Canada, however, with the exception of a few cities and the rural areas served by full-time health units, it is conducted almost entirely by part-time health officers who are also practising medicine in competition with the other physicians. The health officer should be a consultant in communicable-disease control to whom the local physician may turn in regard to atypical cases. When, however, he is practising medicine as well as serving as medical officer of health, he has a dual position that is often difficult. While the average physician may have one or two neurotic patients who give him endless worry, the health officer finds many of the public just as exacting as the worst type of nervous patient. He must know the needs and peculiarities of his community, and at the same

*Presented at a meeting of the Ontario Medical Association, District No. 4, held in Niagara Falls in October 1938.

time have enough backbone to carry out his duties. Prevention of illness is recognized as one of the chief duties of the medical officer of health who has been given almost unlimited power for the purpose of controlling epidemics, preventing disease, and promoting public health in his community. His duties are more or less defined by statute, but without the support and co-operation of the local physicians, his work will in my opinion have little effect.

Some times in his duties the medical officer of health may have to interfere with "personal liberty". In such cases the person concerned may object to the investigations of the medical officer or sanitary inspector; but if it is a health matter, the health officials must control the situation and make people do certain things for the good of the public in general.

Public health work was originally concerned with the control of epidemics of communicable diseases. Later the responsibilities were extended to include conditions which might be responsible for an epidemic, as, for example, the supervision of a municipal water supply in the prevention of typhoid fever. To-day all unhealthful conditions and practices are included, whether or not they relate to communicable diseases. The medical officer of health has an ever-increasing responsibility and few municipalities have ever tried to outline, in writing, his exact duties.

While the method of choosing a board of health varies in different municipalities, it would seem only reasonable that the physicians in each community should in some way have representation on a board which is so closely allied with the profession. In many cities the local medical society is directly represented on the board, so that health questions which concern the local physicians are looked after by that member.

When a new physician locates in a municipality an invitation should be sent to him to visit the health department to become acquainted with the different facilities available for his use, and the physician should receive copies of the different forms used in the municipality especially in regard to the reporting of communicable diseases; also a copy of the Regulations for the Control of Communicable Diseases, issued by the Department of Health of Ontario, as well as various request forms for clinic appointments. By so doing the medical officer of health becomes acquainted with the general practitioner, who in turn knows what is available for him in treatment of his patients and what cases he is required to report.

Because the general practitioner is not as a rule familiar with the quarantine regulations of the different diseases, he should not assume any responsibility in this regard; but should refer all questions about these regulations to the health authorities. Even with a case of serious communicable disease in the home it may be possible, if isolation conditions are good, to allow the breadwinner to go on with his regular occupation. Each case must be decided on its merits by the medical officer of health, and because of this the wise general practitioner will not make any decision for the family in regard to quarantine of contacts.

The medical officer of health has a peculiar relationship to the other general practitioners in his community, because he often must see cases of communicable

diseases that are being treated by the family doctor in order to check the contacts or to find the source of infection. Here one can readily see that there might be a source of endless dispute if health officer and private physician are not working together. Each must help the other for the public good and for the carrying out of the Regulations. The good-will of the family physician is absolutely necessary for the health officer. In return the health officer, who as a rule sees more atypical cases of communicable disease than other physicians in the community, should render free consultative service to any physician who refers a case to him for diagnosis.

REPORTING OF COMMUNICABLE DISEASES

The Regulations of the Province require the physician to notify the health authorities when certain communicable diseases are diagnosed. If the physician reports immediately, the health officials are able to check the possible source of infection and perhaps all the contacts. But when the report does not come in for several days, this essential work is much more difficult and cannot be done nearly so efficiently. Few physicians remember that tuberculosis and venereal disease are also reportable. In our own city an examination of the 1938 records in regard to venereal disease shows that a total of 39 Wassermann tests of blood were reported as positive from samples sent to the laboratory of the Department of Health of Ontario, and from the data sheets these would appear to be new cases. Our department, however, has a record of only 27 of these; so that apparently 12 early cases of syphilis have not been reported. In regard to the control of syphilis, it is not sufficient simply to report the case without finding the possible source of infection or the possible contacts. This, however, is not the responsibility of the family physician but is the duty of the health department, which can accomplish a great deal by close attention to this problem. It is readily seen that, without the co-operation of the family physician, such control is impossible.

REFRIGERATOR SERVICE

Every health department should have a proper refrigerator where supplies of serums and vaccines are available for the local physician at any time of the day or night, and not only should this service be available for the local physicians but for all those practising within the vicinity. As a rule the general practitioner has not a proper place for the keeping of these perishable therapeutic agents; and it is often found that the expiration date has passed or that the temperature of the home refrigerator is not correct.

Most departments expect that the physician using the refrigerator will sign for the material that he takes. Unfortunately in practice this is not the case, and it is not unusual to find that every package of a certain therapeutic agent has mysteriously disappeared some night, making it almost impossible to keep a proper supply on hand or to balance the amount received with that supplied to physicians. If the health department is housed in the municipal building, it is very convenient to arrange a continuous service by having the police department look after the night calls.

CLINICS

To-day there are available through the health authorities many consulting clinics. This service is given in a strictly ethical manner, and no charge is made to the patient. Generally, appointments for these clinics are made through the health department, which advises the physician referring the case when the patient is to be examined. Appointments at these clinics are, as a rule, made only at the request of the family physician. Department of health clinics, with the exception of the venereal disease clinic, should be for consultation only. The actual treatment and supervision of the case should be given by the family physician. If he does not wish to assume this responsibility, the health authorities should be informed.

SCHOOL MEDICAL SERVICE

Many cities have now incorporated school health in their general public health program. This affects both the health authorities and the general practitioners, because if a pupil examined is found to have some defect, the child is referred to the family physician for the correction of the trouble. In these cases the family physician also assumes a responsibility to the municipality, and should he not be able to have the defect corrected the health authorities should be so notified. Years ago it was thought that the school health services might take away a certain amount of work from the family physician, but it has been found that the opposite is the case; and each year the physicians have referred to them patients who under ordinary circumstances would have consulted them.

Because the public health nurses are also interested in the school children, they very often have to consult the family physician so as to be able to instruct the parents what he wishes done for the child. In the past it would seem that the private physician has not used the services of the public health nurse to the extent to which he might have for the mutual advantage of the patient, the family, and the general practitioner.

PUBLIC HEALTH EDUCATION

During the past few years the education of the public in regard to health has assumed a very important place in health work. In this regard the medical officer of health must be a leader. By using newspaper articles, radio talks, and addresses at meetings, he is able to keep the public informed of the new health activities. At all times he should stress the value of the private physician to the community, and this should work to the mutual advantage of the physician and the health authorities.

There is no doubt that a stimulating of community interest in good personal health is a distinct advantage to the general practitioner of medicine. This has been splendidly shown in the fact that each year many more people are going to their physician for an annual physical examination, and this is one of the things which health authorities have stressed for a number of years.

LIBRARY OF PUBLIC HEALTH

In order to help the general practitioner to become acquainted with the newer aspects of public health, there should be available the most recent books on the subject. Unfortunately most of the medical libraries do not include these publications, and it would seem to be the responsibility of the health officials to provide such a library. Most health departments have assumed this responsibility and have such a library available for the general practitioners in their municipality.

Many physicians also wish to keep in their waiting rooms literature for distribution to their patients. The local health officials are able to obtain from different sources a great deal of literature for free distribution. The Department of Health of Ontario supplies certain publications. Several of the national voluntary health agencies also furnish publications in special fields. The Metropolitan Life Insurance Company of Canada provides literature suitable for general distribution concerning diabetes, heart disease, and other conditions of adult life, as well as pamphlets relating to communicable diseases, nutrition, accident prevention, etc.

VITAL STATISTICS

In recent years the health authorities have been taking an active interest in vital statistics and now have accurate data in regard to births and deaths, and also records in regard to the communicable diseases. These data should be available to the general practitioner, especially to those who wish to do any research work.

In conclusion, the benefits which the general practitioner receives from the health authorities far outweigh the pecuniary losses or inconveniences caused by the activities sponsored by the health department. Active co-operation between the general practitioners and the local public health organizations should work to their mutual interest and to the good of the general public.

Mussel Poisoning*

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MUSSEL poisoning may be properly classified as one of the group of food poisonings. It occurs mainly in the summer months and is associated with the consumption of various species of shellfish. In European countries the blue mussel, *Mytilis edulis*, has been most commonly incriminated, while in California the species *Mytilis californianus* has been associated with the outbreaks of mussel poisoning.

Mussel poisoning in man is characterized by quite definite symptoms which may vary in degree depending upon the quantity of poison absorbed. According to Meyer, Sommer and Schoenholz (1) the symptoms of mussel poisoning are primarily peripheral paralysis. Symptoms may vary from a slight tingling and numbness about the lips to a complete loss of power in the muscles of the extremities and neck. Death in such cases is occasioned by respiratory failure. Prinzmetal, Sommer and Leake (2) described the symptoms of poisoning as consisting of paraesthesia of the oral mucous membrane and extremities, ataxia and giddiness, and paralysis mainly in the extremities, neck and muscles of respiration. Incoherence of speech and complete aphasia have been noted.

This particular form of food poisoning has been recognized for over a century. Meyer, Sommer and Schoenholz (1) have thoroughly surveyed the literature and record twenty-one outbreaks. Strangely enough, one of the earliest references is to an outbreak in 1793, at a place now called Vancouver, B.C. Since that time data concerning outbreaks in several European countries, California, Oregon and Alaska, have been published. The largest outbreak occurred in California in 1927 in which there were 102 cases and six deaths. These authors (1) list 243 cases with 16 deaths as having occurred on the Pacific coast of North America.

There are other marine poisonings which may be closely related to mussel poisoning. Fugu poisoning occurs mainly in Japan and is ascribed to the eating of the liver and sex products of a *Tetrodon* fish (Tahara (3), Twakawa and Kemura (4)). A similar poisoning occurs in sub-tropical American countries and is called Ciguatera. Several other marine poisonings have been noted in the literature.

There is little if any difference in the appearance between poisonous and normal mussels. Unusual marine phenomena, such as phosphorescence or "red water", have often been observed to occur when mussels are dangerously toxic but this cannot be relied upon as a warning signal. In California certain marine

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animals, such as sand-crabs, become very toxic, and a high mortality among these animals has been noticed to coincide with the peak of toxicity in mussels. It is believed that the presence of even large quantities of poison does not have any effect on the mussel.

In shellfish the poisoning is apparently concentrated in the digestive gland although it does occur throughout the muscular tissue. In analyzing mussels for toxin only the digestive gland is extracted.

The biological aspects of mussel poisoning have been carefully studied by Sommer, Whedon, Kofoid and Stohler (5). These authors have found that there is a definite relationship between certain plankton organisms and the occurrence of poisoning in shellfish. One particular species of dinoflagellate, *Gonyaulax catenella* W. & K., has been found associated with the increase in toxicity in shellfish. They report that approximately 3,000 *Gonyaulax* cells yield one mouse unit of poison, or 6.5 per cent. of their weight of pure poison.

The chemical nature of the poison is not known but certain of its properties have been well defined. It is thermostable, water and alcohol soluble, dialyzable, stable in acid but unstable in alkaline solution. It is apparently a complex substance. Sommer and Meyer (6) report four fractions which they call P I, P II, P III and P IV. Fraction P I is the fraction which produces the characteristic symptoms in mice of paralysis of the central nervous system, strong spasms and heart block.

Kellaway (7), after studying the action of mussel poisoning on the nervous system, stated that "the poison is a neurotoxin with both central and peripheral actions. The central effects are predominantly upon the cardiovascular and respiratory centres."

Prinzmetal, Sommer and Leake (2) found that the poison is rapidly excreted. They administered 100 mouse units intravenously to a dog and were able to recover 40 units from the urine within two hours.

Treatment of cases of mussel poisoning consists in the prompt evacuation of the bowels with mild alkali and promotion of diuresis. Artificial respiration is employed and ephedrine has been found useful to maintain blood pressure. Digitalis and alcohol are contra-indicated.

Mussel Poisoning in Canada.

In July, 1936, Dr. P. S. Campbell, Chief Health Officer of Nova Scotia, reported to the Department of Pensions and National Health the occurrence of two deaths and a few cases of severe illness in Digby County following the consumption of mussels.

During the past season specimens of mussels and clams have been collected from various localities. The objective was to determine whether or not mussels become toxic, and, if so, to what degree; and whether or not poisonous mussels are confined to any definite localities. To date about 200 collections have been made. A detailed record of weather conditions, tides, water temperature and local peculiarities, etc., has been kept. The technique used for determining the toxicity was that recommended by Sommer et al. (4) and is based on an acid-

alcoholic extraction of the digestive gland. The lipins and pigments are removed by extraction with chloroform and the residue dried and weighed. For titration the residue is redissolved in distilled water and injected intraperitoneally into mice weighing from 18 to 20 grams.

Although it was not until 1936 that evidence became available that mussels may become poisonous in certain parts of Nova Scotia, the local residents have apparently known of this condition for many years. Furthermore, they have apparently known that poisoning is confined to definite localities.

The essential data available from our studies during the past summer are presented briefly in table I.

TABLE I

EXAMINATION FOR TOXIN IN SPECIES OF SHELLFISH COLLECTED IN VARIOUS LOCALITIES OF NOVA SCOTIA AND NEW BRUNSWICK

PLACE	SHELLFISH	No. of Samples*
<i>Nova Scotia</i>		
Centreville	<i>Modiola modiolus</i>	59 Toxic†
Centreville	<i>Mytilis edulis</i>	3 Toxic
Chebogue River	Clams (<i>Mya</i>)	7
Digby Neck	Clams (<i>Mya</i>)	3
East Ferry	<i>Mytilis edulis</i>	4 Toxic
East Ferry	<i>Modiola modiolus</i>	18 Toxic
Grosses Coques	Clams (<i>Mya</i>)	1
Meteghan River	<i>Mytilis edulis</i>	1
Meteghan River	<i>Modiola modiolus</i>	1
New Edinburgh	Clams (<i>Mya</i>)	13
Pinkney's Point	<i>Mytilis edulis</i>	8
Pinkney's Point	Clams (<i>Mya</i>)	1
Purcell's Cove	<i>Mytilis edulis</i>	7
Purcell's Cove	<i>Modiola modiolus</i>	2
Saunierville	<i>Mytilis edulis</i>	6
Saunierville	<i>Modiola modiolus</i>	9 Toxic
West Petpeswick	<i>Mytilis edulis</i>	8
West Petpeswick	Clams (<i>Mya</i>)	8
Yarmouth	Clams (<i>Mya</i>)	1
Sea Wall, Digby	Clams (<i>Mya</i>)	1
Tiverton	<i>Modiola modiolus</i>	6 Toxic
Whale Cove	<i>Modiola modiolus</i>	3 Toxic
<i>New Brunswick</i>		
St. Andrews	<i>Mytilis edulis</i>	13 Toxic
St. Andrews	<i>Modiola modiolus</i>	1 Toxic

*Each sample consisted of from 5 to 10 shellfish, depending on size.

†Toxicity is the smallest quantity of dried extract which is sufficient to kill a mouse weighing from 18 to 20 grams within 30 minutes.

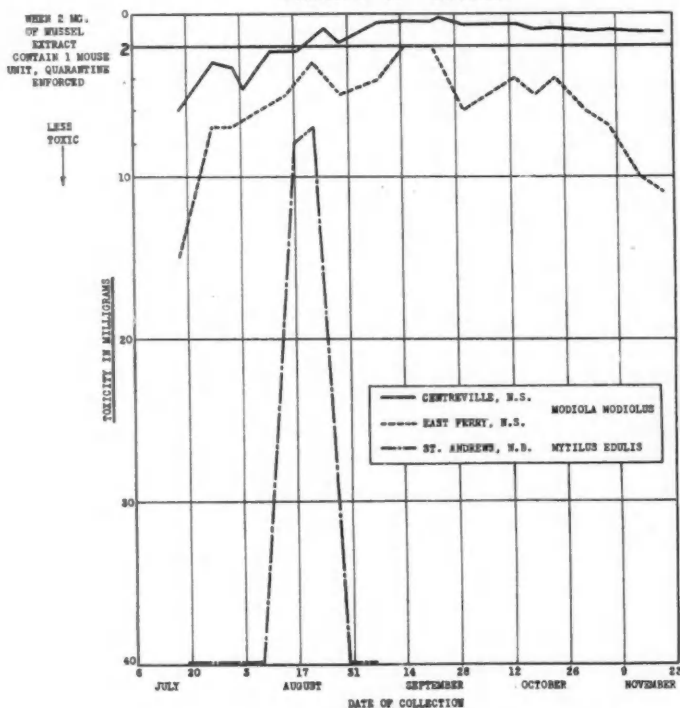
Toxicity, as expressed in this paper, is the smallest quantity of dried extract which is sufficient to kill a mouse weighing 18 to 20 grams within 30 minutes.

Poisonous shellfish have been received from only one main area in Nova Scotia, namely, Digby Neck. In this section shellfish from Centreville and vicinity were found to attain a toxicity of 0.2 mg. (ten times more toxic than from any other location). East Ferry is located about fifteen miles from Centre-

ville on Digby Neck, and yet the toxicity never exceeded 2.0 mg. Tiverton is just across Petit Passage from East Ferry and toxicities from this location were of a similar order. Saunierville is located on the mainland across St. Mary's Bay from East Ferry, a distance of about eight miles. Only three specimens from this area have shown any toxicity and the maximum mouse-unit was 30 mg.

In New Brunswick specimens were obtained from the vicinity of St. Andrews. The maximum toxicity was found to be 7 mg., on August 21st. A week later it had fallen to 40 mg.

FIGURE I
TOXICITY OF MUSSELS



Toxicity is the smallest quantity of dried extract which is sufficient to kill a mouse weighing 18 to 20 grams within 30 minutes.

It is considered by the California workers that when 2 mg. of mussel extract are found to contain one mouse-unit, a general quarantine of the district should be instituted immediately. Based on these limits, Dr. Campbell was advised on August 15th that the study indicated that toxicity had reached a dangerous point in the Digby Neck area. As a result, this area was immediately quarantined.

At the present time, further specimens are being collected from Centreville and East Ferry only.

From the data obtained by the California workers it was expected that high toxicities would occur for only a short time during the summer months. It is evident from figure I that mussels in the Centreville area may contain poison during the colder months as well as during the summer.

Some preliminary observations on the pharmacological action of the Nova Scotian mussel poison have been made. Such evidence as has been obtained in studying the action of the poison on the heart and the clinical symptoms in mice, guinea pigs and rabbits would seem to indicate that the poison is similar to, if not identical with, the California mussel-poison.

CONCLUSIONS

1. Evidence has been obtained to indicate that a poison occurs in certain shellfish in Nova Scotia. This poison is similar to the poison found in California mussels, and, in all probability, is at least closely related to, if not identical with, the mussel poison described by Meyer (1) and his co-workers.

2. Two species of mussels have been found to be toxic, i.e. *Mytilis edulis* and *Modiola modiolus*. So far as can be learned the latter species of mussel has not been previously incriminated in human outbreaks of mussel poisoning.

ACKNOWLEDGMENTS

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Plumbing-borne Diseases*

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PLUMBING, in its widest sense, includes the pipes and fixtures within the dwelling which are used to supply water, gas and heat, and also those which remove sewage from buildings.

The title of this article may seem a little strange as heretofore it has seldom if ever appeared in public health nomenclature. Every year there are many deaths and disabilities due to diseases associated with plumbing. By assigning to this group a definite classification, it may bring these diseases more sharply to the attention of the general practitioner, and emphasize their importance to all public health workers.

During the past twenty years, there has been a tendency on the part of many public health authorities to relegate certain phases of sanitation to positions of minor importance. This has been notably the case with regard to plumbing and plumbing equipment. It has been recognized and accepted in high places, to wit, the 1927 edition of "Community Health Organization" (1), where it is stated: "Sanitary inspection in the light of modern public health theory has come to be recognized as of having less health significance than it was believed to have had in the past. Among the practices of sanitary inspection which are known to have minor or negligible health value, may be mentioned inspection of new plumbing installation." In the revised edition of 1932, the following paragraph occurs: "According to current tendencies in municipal health practice, the bureau of sanitation should include general sanitary inspection and the supervision of housing conditions in occupied buildings, but should not include the approval of building plans or the inspection of plumbing in new buildings" (2).

Many of us took it for granted that most of the sanitation problems had been solved, that further research in and study of such common and familiar things as sanitary fixtures was unnecessary as well as perhaps uninteresting. Many of us were oblivious of the fact that certain connections were being made between pipes carrying potable and non-potable waters, that new types of sanitary apparatus were being fabricated, marketed and installed without sufficient investigation regarding the potential danger to the public health. This was, perhaps, natural because in the shift in interest from sanitation to hygiene, many public health workers felt greater health harvests could be more readily garnered in the greener, pleasanter fields of preventive medicine, as exemplified by the various hygienes.

But the typhoid fever epidemic in Orleans, New York State, in 1928, and the Chicago amoebic dysentery outbreak in 1933, with their heavy toll of sickness

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and death, quickly and tragically reminded us that sanitation is still the fundamental basis of any structure we may build for the promotion of health and the prevention of disease. As health officers, sanitarians, teachers and practitioners of public health, it is hardly enough to say, with respect to this problem: There should be proper and safe plumbing. While it is not expected that we should have the qualifications of sanitary engineers, we should be familiar enough with the broad principles involved in water supplies, plumbing and drainage arrangements as to enable us to appreciate, interpret and discuss the health hazards associated with these systems. For this reason, it may not be out of place to review the whole matter, to consider in detail the important sanitary appliances, and call to public attention some of the specific dangers of bad plumbing as brought to light through our newer knowledge of the subject.

Diseases Associated with Plumbing

The diseases associated with plumbing are:

(a) *Sewage-borne*: typhoid and paratyphoid fevers, amoebic and bacillary dysentery, ankylostomiasis and cholera.

There is abundant evidence that sewage may be deposited on sanitary fixtures or find its way to foods, in such a manner as to favour the spread of these intestinal diseases.

(b) *Sputum-borne*: the common cold, influenza, tuberculosis, Vincent's angina, and scarlet fever. The organisms that cause these diseases and other infections of the upper respiratory tract may be deposited on the nozzles of improperly-designed fountains and on wash-basins.

(c) *Rat-borne*: infectious jaundice, food poisoning, rat-bite fever. It is well known that rats use drains and sewers as highways. If they secure access to dwelling houses through gnawing lead pipes or through defective plumbing, there is a possibility of the spread of disease through water or food contamination. Good plumbing and good sanitation in houses remove this danger.

(d) *Roach-borne*: Roaches frequenting these same highways may transmit some of the intestinal infections, or typhoid, dysentery, diarrhoea, cholera.

(e) *Gas poisoning*: Coal- and water-gas are poisonous and should not be allowed to escape in a room as they contain carbon monoxide, a dangerous, colourless, odourless and tasteless gas. In dwelling-houses, this form of poisoning is usually found in connection with flueless gas-stoves and fireplaces, and ill-fitting water-heaters. Carbon monoxide poisoning may also result from loose gas-fittings and valves, leaky gas tubing, defective furnaces and stoves. Further, there may be a leakage of illuminating gas in public halls and public streets. Occasionally broken gas-mains may permit the escape of gas into the soil with subsequent entry, under favourable conditions, into improperly-constructed cellars and basements. The danger from carbon-monoxide poisoning is not sufficiently appreciated by the public. Most of the deaths from this cause are preventable. They can be prevented by education with regard to the dangers, keeping the permissible amount of carbon monoxide in these gases within the bounds of safety, prohibition of gas-heaters in closed bedrooms, properly constructed and vented gas appliances, periodic examination and testing of gas-

pipes and fixtures, and provision of a plentiful supply of fresh air. These measures would also prevent many non-fatal disabilities due to gas poisoning. Certainly, a considerable amount of headache, lassitude, dizziness and malaise can be traced to the escape of small quantities of illuminating gas in dwelling-houses.

(f) *Lead poisoning* may be included among the plumbing-borne diseases as not infrequently it has followed the use of lead piping and lead-lined tanks in water-distribution systems. It is caused by the plumbo-solvent action of certain waters, notably the acid and soft waters, on lead pipes and cisterns. Prevention consists in avoiding the use of lead pipes, tanks or fixtures for the collection, storage, and distribution of drinking water.

(g) *Venereal diseases*: While it is realized that gonorrhoea is ordinarily spread by sexual contact, yet it may occasionally be transmitted by insanitary water-closets. Toilet seats often become smeared with discharges from the genitals. Secretions containing the disease-producing germ, on account of the moisture usually present in public water-closet rooms, may remain a long time undried and therefore viable. According to Heiman (3), the gonococcus, in comparatively thick layers smeared on glass, has lived for twenty-nine days. In public schools, railway stations, large factories, etc., toilets are frequently used by successive lines of persons, so that there is considerable danger of female infection, more especially if the toilet seat is not of the U type. Most cases of vulvo-vaginitis in children are acquired by close personal contact with infected persons, but inasmuch as indirect contact may be responsible for occasional cases, every care should be taken to provide sanitary fixtures suitably adjusted to the height of pre-school and school children.

There is every reason to believe that syphilis is also occasionally spread through the use of insanitary toilets. In the presence of moisture the spirochaete may live long enough to do damage.

There is much proof that some of the intestinal diseases may be transmitted by sewage. The evidence is not so direct with regard to the sputum-borne diseases, but public health workers agree there is a possibility of such transmission, if germs causing these diseases are deposited on eating utensils by cases and carriers, of which there is ample proof. They may also be left on faucets, push-buttons, and bowls and handles of sanitary fixtures. But even if the danger of disease is rather remote, it is yet the duty of the sanitary authority to provide against any such possible contingency.

Typical Outbreaks due to Defective Plumbing

In 1928, in the city of Orleans, New York State, a disastrous outbreak occurred, causing thousands of cases of enteritis and 212 cases of typhoid. This epidemic was due to "pollution of the suction lines from the auxiliary well supplies" (4), and, incidentally, cost the city in damages over \$400,000.

In the Chicago epidemic of 1933, there occurred 1,409 cases of amoebic dysentery, with 98 deaths. This outbreak was due to defective plumbing involving cross-connections between water and sewage pipes, and through leakage from a defective overhead sewer into a drinking-water tank (5).

Faulty plumbing which permitted sewage to overflow the floor of the kitchen basement of a Montreal institution was responsible, in July, 1936, for an outbreak of 17 cases of illness in which infections of typhoid, paratyphoid A, paratyphoid B, and Flexner dysentery were diagnosed and found (6).

In the Province of Quebec, cross-connections were responsible for 141 cases of typhoid fever and 300 cases of dysentery from November, 1931, to January, 1934 (7).

In Chicago, in December, 1930, Bundesen, Lowney and Rawlings reported an outbreak of diarrhoea in an industrial plant employing approximately 375 men. Investigation showed that cross-connections permitted raw river water to contaminate the plant water supply, causing seven cases of amoebic dysentery and 3 cases of typhoid fever (8).

Objects of Plumbing Arrangements

The objects of plumbing arrangements are: (1) to quickly and safely remove sewage in such a way as to prevent the spread of disease by contact, water or ice, food, flies, rats and insects; (2) to prevent the entry of drain or sewer air into the house; and (3) to establish a current of fresh air throughout the whole system.

The second and third objects may be very briefly considered. Drain or sewer air is prevented from entering houses by water-sealed traps. These traps, which are a part of or are in close proximity to the fixtures, should be so designed, by vent pipes or otherwise, as not to become unsealed. All pipes and drains carrying sewage, especially those within dwellings, should be water-tight. This is not a theoretical danger as observed from the fact that some (5) of the cases of amoebic dysentery in the 1933 Chicago outbreak were caused by sewage escaping through pin-point openings, to fall on unprotected food-stuffs stored immediately beneath, though some distance below the drainage pipes.

It is now generally acknowledged that sewer gas and drain air do not contain disease-producing bacteria. However, it is possible that drain air may have an unpleasant odour and naturally should not be permitted to circulate through houses, hence the requirement that the drainage system be air-tight. It should be proof also against the entry of cock-roaches and vermin. There is not much question regarding the desirability of having a current of fresh air passing through the drainage system. This can be arranged by means of ventilating pipes with or without traps.

Sanitary Fixtures and Disease

The principal sanitary fixtures which receive sewage are toilets, urinals, wash-bowls, bath- and laundry-tubs, kitchen sinks and bubbling fountains. Some of these, though not designed to receive sewage, may do so through blockage. These fixtures discharge into the soil stacks and house drains. The soil stack is vertical, and becomes, on assuming the horizontal position under the basement floor, the house drain which, with or without an intercepting trap, empties into the public sewer. This system should be constructed, operated and supervised with the primary idea of preventing the spread of infection by contact, insects, water, food, or rodents.

Contact and Fly Infection

The most important sanitary fixture is the toilet because it receives human excremental matters. Disease may be disseminated by personal contact and by flies. The bacteria of typhoid, dysentery, etc., may be left on the bowl of the closet through carelessness, splashing or improper construction, and then be brought into the mouth or nose of a susceptible person through the medium of fingers, or they may be transferred to foods by insects and rodents. It is well known that children frequently play in toilet rooms and ply boats in bath-tubs, and children have no instinctive sense of cleanliness. Prevention of infection in this case consists in the use of properly constructed, self-cleansing fixtures. There is also the possibility of the spread of disease, more especially in public places, by contact with contaminated push-buttons and handles of flushing valves. These are being eliminated in some of the newer installations, which are provided with vacuum breakers or anti-siphonage devices and are so designed that the flushing apparatus can be initiated by floor foot action. They have also provision for automatic steam disinfection of the seat immediately after use. This type would be very desirable in comfort stations, restaurants, office buildings, hospitals, theatres, etc. There is not much danger associated with the public urinal. Recent types are showing an automatic flushing device operated by thermal rather than foot or hand action. The urine and flush-water are carried away in such a manner as not to infect shoes. The stall type that can be used as a floor drain when the toilet room is being washed down has many advantages.

Infection of Water through Cross-connections and Back Siphonage

A direct cross-connection is one made by pipes and valves which permit the mixing of a safe and an unsafe supply. For example, a village in the Province of Quebec received its drinking-water from springs. In June, 1934, this supply greatly diminished. To meet the situation, water was pumped into the system by means of a cross-connection from an infected source in the Richelieu River. After a short period, an epidemic of dysentery occurred which affected three hundred persons.

An indirect cross-connection is one made by pipes or valves between a water-supply system and a drainage system or its fixtures, as when the feed-pipe of a safe water-supply could be submerged by unsafe water (sewage) and the unsafe water drawn back into the safe water-supply.

There is great danger that faulty plumbing may permit the spread of disease through water contamination due to cross-connections and back-siphonage (the sucking of an unsafe water from a fixture into safe water due to the production of a vacuum in the water-supply leads). If this is to occur, two things are required. In the first place, speaking generally, there must be a block in the trap, waste-pipe, drain or sewer. This, however, is not always necessary as back-siphonage may occur in the absence of obstruction as seen in some of the siphon-like closets and in those with flush-valves on the side. In these closets, if back-siphonage occurs, the contents of the bowl can be drawn back into the

water lines without the bowl's being stopped up and flooded. For example, the fixture might not have been flushed for some time and might contain urine from a typhoid carrier. Back-siphonage then would readily contaminate the drinking-water.

In the second place, a vacuum must develop in the safe water supply lines. This vacuum may be created by a variety of conditions. A large quantity of water may be used on the floor below, occasioned by flushing several toilets at one time. The water supply may also be suddenly reduced by drop of the pressure in the city water mains, due to a fire or the excessive use of water in lawn- and street-sprinkling. The rapid filling of laundry tubs in the basement may also result in a marked fall in pressure. It is known, too, that the decrease in pressure is often due to friction, caused by too large a flow of water for the piping system. The piping as originally installed is either too small for the type and number of fixtures or it has become too small by corrosion. The turning off of the water supply may also favour the creation of a vacuum.

This vacuum in the water-supply lines draws on the submerged water-pipes and pulls the contaminated water (sewage) from fixtures into the supply lines. On restoration of the normal pressure, the contaminated water is distributed through the safe water system and subsequently drawn from the various taps for human consumption.

Prevention of Infection through Cross-Connections

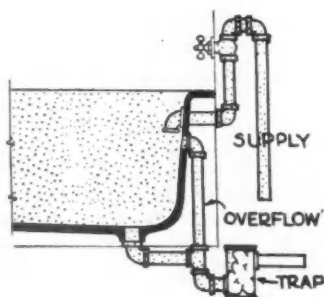
In the case of *direct* cross-connections, the essential need is to require, by statutory enactment, that only a safe water supply be permitted in a building. If two systems have been installed, the danger associated with the unsafe one should be removed, or the system eliminated. Where *indirect* cross-connections exist, the danger may be avoided by providing efficient vacuum breakers or flush valves that are several inches above the overflow line of the toilet bowl; or by placing the water inlets to the various fixtures several inches above the overflow line of the fixture. If a vacuum occurs, nothing but air can be drawn into the supply lines. The causes that result in a vacuum should be investigated and removed.

Wash-Basins

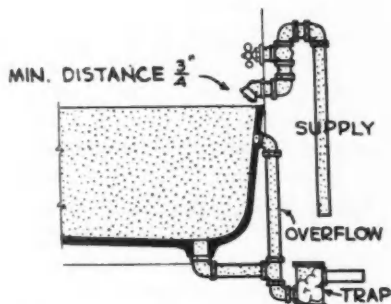
There is every hygienic reason to condemn the common wash-basin that is in general use at the present time. It is almost as insanitary as the common drinking-cup. The previous user may have contaminated the basin. Sometimes an attempt is made to clean the bowl with a discarded towel which possibly adds more bacteria. The immediate user then proceeds to wash face and hands in stationary water, and has not only to deal with re-applied organisms from his own skin, but also runs the risk of implanting disease-producing germs from previous users on his own skin. There is also the danger of infection from the tap or faucet and, as already mentioned, from a possibly submerged inlet.

Prevention consists in providing for universal use a wash-basin constructed on the principles involved in the surgeon's wash-up sink. The fixture should

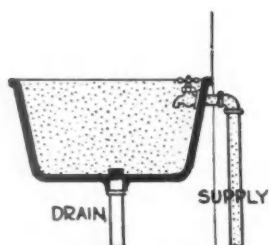
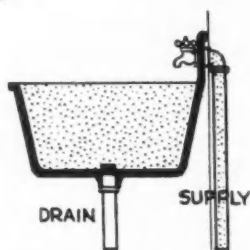
UNSAFE



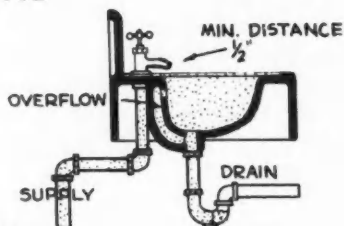
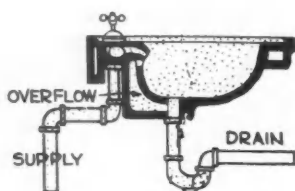
SAFE



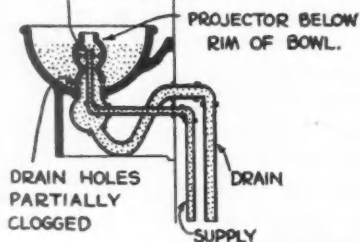
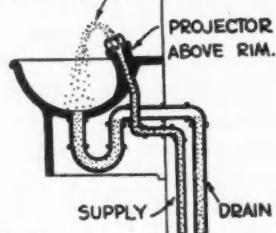
BATH-TUB

INLETS BELOW
RIM OF FIXTURE.INLETS ABOVE
RIM OF FIXTURE.

LAUNDRY-TUB



WASH-BASIN

FRESH WATER PASSING
THROUGH DRAIN WATER.TWO STREAMS CON-
VERGE HERE.

DRINKING-FOUNTAIN

be provided with an elevated combined cold and hot water rose spray which allows for manipulation of the faucet by means of the elbow, knee or foot. The water supply pipe should be two or three inches above the high-water line. There should be no waste plug to hold back the water. This type of fixture would allow for washing in running water, the individual holding the hands cup-wise. It is economical, and splashing is eliminated. If this type of wash-up sink is not practicable, then the fixed, double faucet, or "mixer", would be quite satisfactory.

Bath-Tubs

The most essential requirement in this fixture is that the water inlets should be placed well above the rim of the tub to prevent any possibility of back-siphonage. It is important also to note that in most homes, a hose is available for connection to hot and cold water inlets. This is for shower-baths or cleaning purposes. If the hose is not disconnected after use, its discharge end is submerged, with the dangers already described. The public should be taught with regard to this danger and be cautioned against allowing the hose to remain in the bottom of the tub. It should be disconnected, hung up and allowed to drain.

Drinking Fountains

An insanitary drinking fountain may be the means of spreading some of the sewage-borne diseases. If the drain is blocked, a vacuum with back-siphonage may occur. It may also transmit some of the sputum-borne diseases if the user is able to touch the outlet or if he deposits saliva on the outlet, or if the fresh water bubbles up through partial or total clogging of the fountain drain. A sanitary drinking fountain should be: made of porcelain, enamelled ironware, or other impervious material; self-cleansing and readily accessible for cleansing; designed to deliver a slanting stream of water so that the waste will not fall back into the orifice, and protected with a guard to prevent the mouth, nose, hands or sputum of persons using it from coming into contact with the nozzle; provided with a nozzle at least one inch above the lip of the bowl so as to eliminate any danger of its being flooded in case there should arise any blocking of the drain; on a supply line which could not, under any circumstances, drain unsafe water from other fixtures.

Prevention of Plumbing-Borne Diseases

The principles involved in the potential dangers of cross-connections as commonly met with in dwelling-houses have been presented and the hazards have been pointed out with reference particularly to the most universally used sanitary fixtures. The same health hazards may be present in many other installations as met with in hotels, factories, stores, restaurants, cheese factories, creameries, and other large buildings. Particular attention should be paid to soda-fountain equipment, mechanical dish-washers, hospital slop sinks, bed-pan sterilizers, water filters and sterilizers, and instrument sterilizers.

General Measures:

1. Education of all interested and responsible persons, such as health officers, engineers and inspectors, architects, plumbers, etc., with regard to the public health hazards of water supplies, sewage disposal systems, illuminating gas and general sanitation of buildings.
2. Prevention of manufacture of potentially dangerous sanitary and gas fixtures.
3. Approval by municipal and provincial or state health departments of all sanitation plans, with follow-up work to see that the approved plans are followed.
4. Approval in new installations of all plumbing and gas fixtures, piping, vacuum breakers and other devices eliminating cross-connections. This applies to installation replacements, repairs, maintenance and periodic inspection.
5. Employment only of qualified plumbers. Handy men should not be permitted to practise plumbing.
6. Frequent inspection by competent plumbing inspectors of all plumbing installations, including gas fixtures, more especially in hotels, restaurants, hospitals and factories.
7. Survey of all existing institutions with a view to eliminate, as soon as possible, all cross-connections which may permit of any contamination of water supplies.
8. The construction, maintenance and supervision of drains and sewers in such a way as to prevent any blockage, retention of sewage and flooding of basements.
9. The regular testing of all iron and steel pipes for evidence of corrosion and leakage.
10. The placing of all pipes and drains in such a position as not to threaten the safety of water supplies.

Special Measures:

1. Authorization of one safe water supply for every building.
2. Avoidance of any cross-connections between water systems and drainage systems or sewers.
3. Avoidance of the use of submerged water inlets to any plumbing fixtures.
4. The provision of proper and efficient anti-siphonage devices on flush-valves or flush tanks.
5. Proper construction, placing, protection and maintenance of all water tanks in buildings.
6. The storage of water, ice and food in such a manner as to prevent contamination through leakage, flooding and flies.
7. The installation of sanitary wash-basins.

ACKNOWLEDGMENT

The writer is indebted to the Wisconsin State Board of Health for the accompanying illustrative plans.

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Ankylostomiasis in a Chinese Patient*

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AND

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THE patient, a Chinese laundryman, came to Canada fourteen years ago. He went back to China in 1936, and returned to Canada one year ago. He came to see his physician (W.S.) complaining of pain in the epigastrium. An X-ray examination of the gastro-intestinal tract showed that the stomach was much enlarged, as were also the liver and spleen.

Blood examination did not show the presence of anaemia but there was an eosinophilia of 20 per cent. A complement-fixation test was made employing echinococcus antigen. The result was negative. Examination of faeces did not show the presence of endamoebae or endamoebic cysts. However, both hookworm and whipworm ova were present. The hookworm count was 200 per gram of formed faeces. In the first sample examined, the ova had already partially developed as the sample was not fresh. The ova did not have their characteristic appearance of from four to eight lobes but consisted of an oval sphere of smooth contour, containing a number of small spherical bodies. In the next specimen examined in the fresh state, the ova presented a typical appearance. Some of the faeces was washed and left at room temperature. Three to four days later typical larvae of hookworm had developed.

A vermifuge of carbon tetrachloride and chenopodium was given. One stool examined failed to show the presence of worms. Unfortunately it was not possible to obtain a further specimen from the patient. One month after the first blood examination and about two weeks after the vermifuge had been given the eosinophilia was 14 per cent.

Stoll, in the Puerto Rico survey, stated that for the *necator americanus* there were on the average forty-four eggs per gram of formed faeces for each female worm present, while the *ankylostoma duodenale* lays about five times as many eggs as the necator. In China the infections are mixed and the average is three times as many eggs as where the infections are pure *necator americanus*.

In this case there would be from two to five female worms present, depending on whether the worms were *ankylostoma duodenale* or *necator americanus*. As this is a light infection it is quite possible that the symptoms which led the patient to come to the doctor were not connected directly with the hookworm disease. Few whipworm ova were found in the specimen.

While in China the patient lived at Hoi Ping, a village in South China. This village is situated about 100 miles south and west of Hong Kong. The

*Presented at the sixth annual Christmas meeting of the Laboratory Section, Canadian Public Health Association, Toronto, December 20, 1937.

climate is subtropical with the wet season in the summer months. Rice and vegetable farming are carried on, with very little mulberry cultivation. During the rainy season the patient was accustomed to go barefoot.

In 1913, Bell and Brown reported that there was a high percentage of hookworm infestation in immigrants from Hong Kong and Kwongtung into the U.S.A. The province of Kwongtung, which this man visited, is one of the most important and widespread epidemic areas of hookworm infestation in all China.

The major factor in the spread of the disease is the use of night-soil as a fertilizer. Cort and his co-workers in their survey on hookworm infestation in China, in 1926, found that mulberry cultivation gave a high percentage of cases while there was very little among the rice farmers. Night-soil was used in both types of farming. The difference was due to the fact that night-soil is applied to the rice fields which are under water and the larvae live only a short time in water. They require damp soil but not wet soil. This patient probably acquired his infection one year ago while in China among the vegetable fields near his native village.

The question arises as to the public health significance of hookworm infections in this country. In the Southern United States where the living conditions are not good and the economic level of the inhabitants is low, it is a

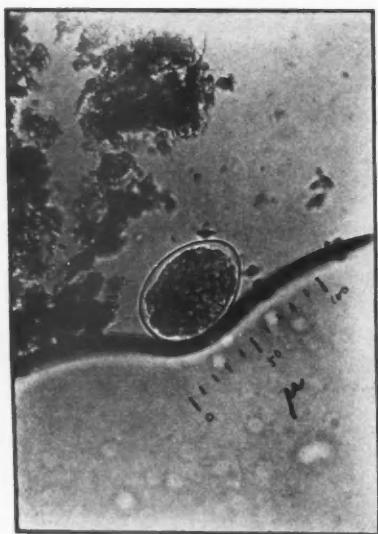


FIGURE I.

Hookworm ovum partially developed.

problem. In 1936, Upton in East Texas reported infestations as high as 48 per cent. in some rural areas. In 1931 ankylostomiasis was made a reportable disease in Ontario and this is the first reported case since that time.

In this country there is not much reason to suspect that infection is prevalent. There is, however, the possibility that the infection might be introduced in areas where Chinese are doing market gardening. A number of these Chinese are constantly visiting China and they may be infected when they return to Canada. Should they use night-soil on the vegetables in the market gardens, there is the question of infecting those who work in the gardens. Even if these infections do occur, there is not much danger of the larvae finding their way into the salads of the city dweller, as the larvae are rather easily destroyed by drying and sunlight.

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CONGRATULATIONS AGAIN TO QUEBEC AND MANITOBA

LAST year the JOURNAL had the pleasure of congratulating the Provinces of Manitoba and Quebec on their success in the first Rural Health Conservation Contest held in Canada. It is a pleasure again to extend to these provinces congratulations on the occasion of receiving the awards in the 1938 Contest. As announced elsewhere in this issue, the health unit embracing the counties of St. Jean, Iberville, Laprairie and Napierville, Quebec, has the honour of receiving the major award. This county health unit, one of the first to be organized in Quebec, received first place in the 1937 Contest and it is a tribute to the excellence of its work that it has maintained the premier place among full-time county health units in Canada. In addition, awards of merit have been given to the county health units of Terrebonne, Rimouski, Argenteuil, St. Hyacinthe-Rouville, Temiscouata-Rivière du Loup, Laviolette, Nicolet, and Matane; and to the St. James-St. Vital Health District in Manitoba. Evidence of the increasing effectiveness of the work of full-time county health units in Canada is found in the fact that these awards of merit, justified by the excellence of the health programs, were awarded to nine units in the 1938 Contest, in contrast to six in 1937. Three units have received the award a second time: the Terrebonne and Nicolet County Health Units and the St. James-St. Vital Health District.

Twenty-nine units completed the requirements of the Contest, filing the detailed schedules outlining their health program. A number of units did not compete, owing to the fact that they have but recently been organized. It is obvious that several years must elapse before a local organization can consider itself sufficiently well developed to make a satisfactory showing in the contest. Further, in some health units the work has been developed to meet special needs, thus leaving a part of the program to be developed later. Although such units cannot receive awards, the value of the Contest in reviewing their accomplishments and needs is appreciated. Without question, the holding of the Rural Health Conservation Contest in Canada is most helpful and is advancing the movement for adequate rural health services in every province. The Canadian Public Health Association is deeply indebted to the American Public Health Association and to the W. K. Kellogg Foundation for making possible the holding of the Contest in Canada.

LETTER FROM GREAT BRITAIN

GEORGE F. BUCHAN, M.D., F.R.C.P., D.P.H.
London

THE SHORTAGE OF NURSES

IN a previous communication I referred to the fact that an Inter-departmental Committee on Nursing Service had been set up jointly by the Minister of Health and the President of the Board of Education. This committee have now reported and the gist of their recommendations may be summed up in the statement that in the future the profession of nursing must be made sufficiently attractive to compete with other employments in which women are engaged.

The nursing profession in this country is to some extent under State control. The Nurses Registration Act which set up the General Nursing Council was passed so that the public might be assured that a nurse who is State-registered has had training in nursing the sick. The General Nursing Council keeps a register of nurses and makes rules regulating the conditions of admission to the register. At the present time 89,206 names are on the general and supplementary parts of the register.

The report of the Inter-departmental Committee states that the present shortage of nurses arises in part from the great extension of hospitals due to the passing of the Local Government Act of 1929 and the Committee foresee that there will be required in the future a great increase of nurses of all grades.

The question of the general education of women entering the nursing profession is discussed as well as the gap which exists between school-leaving age at 14 to 16 years and the commencement of nursing training at 17 or 18 years. It is proposed to fill this gap by pre-nursing courses and examination tests.

The Committee emphasise that it is necessary that nursing should be

recognised as a service of outstanding national importance and that the status of nurses should be comparable to that of teachers, that adequate remuneration agreed on a national basis should be given, that superannuation schemes should be operative for all nurses, that the hours of duty should average 48 per week, that nurses off duty should be free from all restrictions as far as this may be possible and facilities should be provided for nurses for recreation and social life.

There is little doubt that the report is one of great importance. It approaches the subject in a sympathetic manner and I feel sure that if its recommendations are implemented, sick persons in hospitals and at home should not want for the services of well-trained nurses.

THE SUPPLY OF MIDWIVES

THE Central Midwives Board has been similarly considering the question of the shortage of practising midwives. There are some 63,000 names on the roll of midwives, which is kept by the Central Midwives Board. Annually some 3,000 names are added to the roll, but of this number only 900 notify their intention to practise as midwives. At least 1,000 new practising midwives are required to replace the annual shortage. It is therefore difficult to forecast how great the shortage is or is likely to become. It is nevertheless felt that if the service of practising midwives is to be maintained the conditions of employment have to be made comparable with those of the teacher, the health visitor and the state registered nurse.

HEALTH IN INDUSTRY

THE Annual Report of the Chief Inspector of Factories and Workshops

always makes interesting reading. This year the report appears just after the coming into operation of the Factories Act, 1937. Although this Act is new there is nothing revolutionary about its provisions which had previously all been carried out voluntarily by the more progressive factories. The Act, however, gives the responsible Minister power to require reasonable arrangements for medical supervision under certain circumstances and may well prove to be the means of bringing into line some of the less progressive factories. The ultimate effect must be to raise the general standard of health, safety and welfare to a high level.

A special study begun by the Factory Inspectors in 1937 on accidents to young persons was continued in 1938 and three tentative conclusions were further confirmed, namely, (1) that insufficient training is being given to young persons, (2) that among the personally-caused accidents some circumstances outside the factory should be considered, and (3) that the statutory first-aid requirements alone are inadequate to prevent accident disablement.

The training and instruction are, of course, the responsibility of the engineer, but the other aspects of accident provision are largely medical. If industrial firms availed themselves of the service of a whole-time medical officer many of these accidents could probably be avoided. Careful investigations would be made of accident proneness. Accidents attributable to the fact that the youngster was not equal to the work might be eliminated. The time off for sickness would be cut down. There is considerable evidence to show that minor accident injuries and abrasions are neglected and that far too many become septic. Many larger firms have a medical officer in whole-time employment. In smaller works the benefits of medical supervision might be secured by grouping, each firm contributing proportionately to the cost of a whole-time medical officer.

The number of cases of lead poisoning notified is the smallest since notification came into force. The uses for lead are manifold and the ways in which poisoning may be contracted are numerous and not always realised at the time.

Cases of gassing from carbon dioxide show an increase while a new industrial hazard has been found in the volatile mercuric iodide used as a dressing for seeds.

Seventy-four deaths from silicosis and sixty-five from silicosis and tuberculosis came to the knowledge of the department. Pottery is the industry accounting for the large number of deaths, the duration of employment of cases dying being nearly 40 years. If preventive measures are to be effective more energy should be expended on the finding of a harmless substitute for silica rather than in the protection of the individual worker by dust respirators or breathing apparatus.

Nearly all the 2,000 cases of dermatitis were voluntarily reported. Work on the production of a "barrier" substance now promises a simple and effective method of prevention. When practical tests are completed it is hoped to include a prescription for this substance in official memoranda and notices.

An increase in the amount of filleting carried out on the fish docks has resulted in increasing incidence of warts on the hands of the fish workers; the filleters are most affected, then the headers—those who cut the heads off, then the packers and fish washers. Even the lorry drivers who handle the barrels of wet fish are affected. It has not yet been decided whether the fish carries the wart virus or whether the working benches get accidentally affected with the human virus.

Further attention has been given to the effects produced by pneumatic tools and experiments have been carried out as to the best type of chamber for the protection of a worker on radioactive substances in luminous paints.

NATIONAL COUNCIL FOR MENTAL
HYGIENE

THE fifth biennial conference was held in London from January 12th to 14th, 1939. The subject for discussion at the opening session was "Is our National Intelligence Declining?" The chief evidence offered in favour was our differential class fertility, the decline in intelligence being estimated at 1 per cent. every ten years. But while it is a fact that acknowledged intellectuals are not sufficiently prolific, it is not admitted that the upper social classes have a monopoly of brains. What is needed, as was pointed out by one speaker, is a more practical use of our available intelligence. This we are gradually achieving by increasing efforts to fit only square pegs into square holes.

At the afternoon session a plea was made to the medical profession for a more tolerant attitude to, and for fuller co-operation with, the lay psychiatrist. It was not urged that all and sundry who wished should practise psychiatry, but it was urged that the layman with special training is better able to deal with suitable cases referred to him, e.g. cases of a spiritual nature, than the doctor himself. While the psychological training of the medical student remains in its present embryonic state and as the supply of medical psychiatrists in the more remote districts is never likely to exceed the demand it is probable that a beneficial arrangement could be made for the use of lay psychiatrists provided that co-operation with the doctor was close.

Two sessions were devoted to delinquency, one to the sexual delinquent and one to the juvenile delinquent. The frequency and causes of each were discussed and it was agreed that while some of the causes were inherent, e.g. mental defect, and many difficult or impossible to rectify, many of the cases would be helped by psychological treatment preferably residential. To this end a warm welcome was given to the Criminal Justice Bill, now before

Parliament, which seeks to ensure that all delinquents suffering from mental abnormality requiring treatment shall receive it. In the discussion that followed one speaker mentioned that, in his experience, sex delinquency in cases with an institutional upbringing was often due to ignorance of sex and sex function.

Another afternoon was devoted to the "Out-Patient Mental Treatment Clinic." While the utility of these clinics cannot be doubted, facilities are at present grossly inadequate and local authorities were urged to make greater use of their powers. Although the clinic should be in close liaison with both a mental and a general hospital, it was agreed that the clinic should not be on the mental health premises. Opinions differed as to whether or not the clinic should be apart from a general hospital, the majority being in favour of the latter. As to the designation of the clinic any direct reference to the word "mental" was considered undesirable, "nerve clinics" being one of the most popular suggestions.

A session was devoted to Mental Hygiene and the Press, the present-day sensationalism of the popular press being deplored. It was considered that nowadays such a great institution for good or evil as the press should have higher ideals than mere circulation and dividends. The Press in reply, while admitting some of the charges, said that doctors were in part to blame with their specialised jargon and unapproachability, and asked for a revision on broader lines of the etiquette of their dealings with lay journals.

At the third morning session the education of the child with special reference to emotional needs was discussed. All the speakers were agreed, many examples being given, that our present English educational system, where co-education is the exception rather than the rule, does not sufficiently cater for the emotional factor and a plea was made for a system of education more on Scottish lines. It was pointed out that some of the emotional troubles in

adult life could be traced to this, an example being that of the average English undergraduate who, as a result of his monastic public school life, has sometimes the emotional outlook at 20 of a child of 14. It was further suggested that a reorientation of his ideas might in some measure solve the problem of the present low birth rate among the professional classes, as his infantile attitude to marriage would disappear.

CENTRAL COUNCIL FOR HEALTH EDUCATION

THE eleventh Annual Health Education Conference was held in London on January 18th and 19th, 1939. The first session was devoted to viewing the Health Exhibit from the Glasgow Exhibition which is now in London and is subsequently to tour the country. This exhibit, the most comprehensive yet attempted for popular view in Great Britain, covers all the health services of the nation by means of picture poster, working model and film. The most striking exhibit, the mechanical man, is an excellent working model of physiological processes, but why should the exhibit be cut off above the pelvis? We still have progress to make in eliminating the old taboos. The remaining sessions were devoted largely to the best methods of furthering health education. We have progressed through the stage of mitigating the effect of overt disease only, the problem now being how to render the public health conscious in contradistinction to disease conscious.

The Minister of Health in his introductory address pointed out that although expenditure on health education could show elusive dividends only, its importance was appreciated by the Government, a monetary grant now being made as a more tangible expression of the Government's support. The first speaker stressed that to be of any real use health education must be continuous. To this end it is considered that health weeks, for example, in various towns are of little value unless

followed up by further work and propaganda. To sustain interest it is essential that the method of approach should be continually altered. In the course of the Conference a discussion took place on the part of the general medical practitioner in health education. While the general practitioner can be a source of immense help through the individual method of approach, it was agreed that under present conditions of practice he has little time for such activities and unfortunately there is no immediate likelihood of any change in these conditions. The functions of parents in relation to the health education of their children was also considered. It was generally agreed that theoretically parents should be the dispensers of such instruction, but it was nevertheless felt that better results at present could probably be obtained through the schools. Lack of training in marriage and parenthood was also stressed, and with the development of the nursery school—a valuable factor in itself in health education—it was suggested that the time was now ripe for the introduction of girls of school leaving age into these schools, thus bringing them into direct contact with young children under optimum conditions.

The representative of one of the few local authorities in this country employing a whole-time propaganda officer, said that one of his greatest successes had been with a library of posters circulated among the child welfare clinics. These posters had to be specially prepared and he suggested that a similar series should be made available nationally. Another speaker urged that more should be done on the new housing estates. Too often, large populations are deposited there without thought to their communal life, thus largely wasting the immense possibilities of their improved housing conditions.

The Conference was not very well attended. On the whole it was interesting but, as indicated by the Minister, the resulting dividend can neither be forecast nor calculated.

Awards in the 1938 Canadian Rural Health Conservation Contest

THE awards in the 1938 Rural Health Conservation Contest in the United States and Canada were announced by the Grading Committee on April 19th. The Contest is financed by the W. K. Kellogg Foundation of Battle Creek, Michigan, and conducted in Canada by the Canadian Public Health Association in co-operation with the American Public Health Association.

Awards are made not necessarily to the healthiest communities, but rather on the effectiveness with which a community is meeting its health problems. Each county is appraised by a Grading Committee composed of a group of carefully-selected health experts. The community is appraised on the measures that it takes: (1) to provide and safeguard its water supply; (2) to furnish adequate and safe sewerage disposal; (3) to reduce infant and maternal deaths; (4) to combat tuberculosis and syphilis; (5) to protect its citizens against other communicable diseases; (6) to insure healthy children; (7) to protect and safeguard its milk and other foods; (8) to promote effective co-operation with its physicians and dentists in furnishing necessary services to all those who need them; (9) to enlarge and improve its lay-understanding of ways and means of preventing sickness and death and of maintaining good health.

The winning unit in the 1938 Canadian Rural Health Conservation Contest is the St. Jean-Iberville-Laprairie-Napierville County Health Unit, with headquarters at St. Jean, Quebec. The medical officer of the unit is Dr. J. A. Lapierre, D.P.H.

Awards of merit go to the following units:

Terrebonne County Health Unit, St. Jerome, Quebec. Dr. F. Leclerc, D.P.H., medical officer.

Rimouski County Health Unit, Rimouski, Quebec. Dr. J. E. Germain, medical officer.

Argenteuil County Health Unit, Lachute, Quebec. Dr. E. Lalande, D.P.H., medical officer.

St. James-St. Vital Health District, St. James, Manitoba. Dr. I. M. Cleghorn, D.P.H., medical officer.

St. Hyacinthe-Rouville County Health Unit, St. Hyacinthe, Quebec. Dr. G. Choquette, D.P.H., medical officer.

Temiscouata-Rivière du Loup County Health Unit, Rivière du Loup, Quebec. Dr. S. Sirois, D.P.H., medical officer.

Laviolette County Health Unit, Grand-Mère, Quebec. Dr. E. Frenette, D.P.H., medical officer.

Nicolet County Health Unit, Nicolet, Quebec. Dr. Jean Paquin, D.P.H., medical officer.

Matane County Health Unit, Matane, Quebec. Dr. J. R. Larose, D.P.H., medical officer.

The health unit embracing the counties of St. Jean, Iberville, Laprairie and Napierville has the distinction of winning for the second time the major award, having obtained first place in the 1937 Contest—the first to be conducted in Canada. Awards of merit were received for a second time by the Terrebonne County Health Unit, the St. James-St. Vital Health District, and the Nicolet County Health Unit. Nine awards of merit were made in the 1938 Contest, as compared with six in 1937, reflecting the increasingly high standard of rural health work in Canada.

CANADIAN PUBLIC HEALTH ASSOCIATION ONTARIO HEALTH OFFICERS ASSOCIATION



ROYAL YORK HOTEL, TORONTO, JUNE 12-14

IN planning the program for the twenty-eighth annual meeting of the Canadian Public Health Association, which will be held in Toronto on June 12th to 14th in conjunction with the twenty-fifth annual meeting of the Ontario Health Officers Association, the committee has chosen the most important problems confronting medical officers of health and public health workers.

The opening session on Monday morning, June 12th, will be under the direction of the Ontario Health Officers Association and will discuss, in a series of short papers, the problems of the local health officer. At the first general session, to be held on Monday afternoon, Dr. R. E. Wodehouse, Deputy Minister of Pensions and National Health, will give his address as President of the Canadian Public Health Association. Current practice in communicable disease control will be reviewed by Dr. Haven Emerson, Professor of Public Health Administration in Columbia University; and the discussion will be opened by Dr. R. B. Jenkins, Chief of the Division of Epidemiology in the Department of

Pensions and National Health. Dr. Emerson will outline the findings of the committee of the American Public Health Association that has been studying the present regulations as relating to quarantine and isolation. A committee of the Canadian Public Health Association will carry forward a similar study in Canada, with the objective of having uniform quarantine and isolation regulations in the various provinces. Other features of this session include an address from the Medical Officer of Health of Bermuda, Dr. Henry Wilkinson; and the presentation of the awards to the winning units in the second Canadian Rural Health Conservation Contest.

On Tuesday morning the second session of the Ontario Health Officers Association will convene. The first meeting of the Section of Epidemiology and Vital Statistics will afford the opportunity for the presentation of a series of papers on recent outbreaks of communicable diseases. The cost of public health administration in Canada as a whole and in the counties of Ontario will also be discussed. A meeting of the combined Sections of

Public Health Nursing and Mental Hygiene will be held on this morning.

The second general session, to be held on Tuesday afternoon, will be devoted to the provision of medical care. Sir Arthur Salusbury MacNalty, Chief Medical Officer of the Ministry of Health of Great Britain, will outline the national health-insurance scheme and the other provisions that are made in Great Britain. The present status of the movement for

the subject of a presentation by the Laboratory Section. Practical considerations in sanitation will be presented by the Public Health Engineering Section.

The third general session, on Wednesday afternoon, will be devoted largely to a discussion of nutrition. Professor Edward P. Cathcart of Glasgow University will discuss certain aspects of the problem; and Professor E. W. McHenry of the School of



DR. R. E. WODEHOUSE



DR. HAVEN EMERSON

more adequate provision of medical care in the United States will be reviewed. The situation in Canada will be outlined and findings presented as relating to studies conducted in Manitoba by Dr. F. W. Jackson, Deputy Minister of Health and Public Welfare of that province.

The annual dinner will be held on Tuesday evening.

On Wednesday morning three important Section meetings have been designed to present for medical officers of health the significant developments in these technical fields. The Section of Vital Statistics and Epidemiology is co-operating with the Section of Public Health Nursing in a review of the contribution of the public health nurse in the local health program. Specific methods of prevention in diphtheria, scarlet fever, and certain other communicable diseases will be

Hygiene and Connaught Laboratories, University of Toronto, will present the findings of surveys made in Toronto which provide essential information for the development of any plans for the improvement of nutrition in Canada. The present status of the treatment of pneumonia will also be reviewed at this session.

The holding of the meetings in the second week of June affords the opportunity of enjoying Toronto at the pleasantest time of the year. A cordial invitation is extended to visiting ladies to register with the ladies' committee so that arrangements may be made for them to visit conveniently many centres of interest. It is believed that this arrangement is preferable to a fixed program. The ladies are cordially invited to attend the annual dinner of the associations on Tuesday, June 13th.

BOOKS AND REPORTS

Practical Bacteriology, Haematology and Animal Parasitology.

By E. R. Stitt, M.D., Sc.D., LL.D., Paul W. Clough, M.D., and Mildred C. Clough, M.D. Ninth ed. P. Blakiston's Son and Company, Inc., Philadelphia, 1938. 961 pages, 208 illustrations. \$7.00.

OVER ten years have elapsed since the last edition of Stitt's classical handbook was published. In the past this work has come to be regarded as indispensable in the routine diagnostic laboratory and in remote fields where well-equipped libraries are inaccessible. This new edition, rewritten, revised and enlarged, is therefore welcome. In it all available types of laboratory procedure are considered and the space given to the interpretation and diagnostic significance of the various laboratory procedures and the correlation of the data obtained with the clinical picture has been extended.

The work is divided into four parts: bacteriology, haematology, animal parasitology, and pathological and chemical examinations of the various fluids and organs, while much useful information is condensed into an appendix of 115 pages. Short of reproducing the table of contents, however, it is impossible to indicate the scope of the work. The revised section on haematology is excellent, perhaps the best in the book. An entirely new chapter on fungi has been added, the more recent views of the function of the endocrine glands are summarized, and a discussion of the principal food-deficiency diseases supplements the table summarizing the characteristics of the vitamins. A virtually new chapter on filterable viruses is included.

Some defects may be mentioned. In the section on smallpox and vaccination it is unfortunate that the misstatement that "the immediate reaction or reaction of immunity, which indicates full protection against smallpox" should be

perpetuated. The space devoted to vaccination against poliomyelitis is misleading. The sections on bacteriology are not uniformly good. For example, no reference to the Vi form of *B. typhosus* is included in the section on this organism and the serological differentiation of streptococci is very briefly dismissed. No reference is made to the macroscopic agglutination test with *L. ictero haemorrhagiae* and the possibility of mild and inapparent infections with this organism.

Although errors occur and perspectives may be distorted in a condensed work of this nature, it would be over-critical to stress these unduly. The book remains unique and the authors and their collaborators are to be congratulated on their successful endeavour to bring it up to date and expand its sphere of usefulness.

James Craigie

The Hospital Survey for New York.

Volumes 1, 2 and 3. Published by the United Hospital Fund, 630 West 168th Street, New York, 1938.

The Hospital Survey for New York, published in three volumes, is the most comprehensive work of its kind, certainly on this continent. It deals with all phases of the institutions and agencies for the care of the sick in the New York metropolitan area, an area occupied by almost eleven million people. The survey had its origin with the United Hospital Fund. Supported by a grant from the Carnegie Corporation and additional donations in excess of \$80,000, total expenses of the survey including the cost of publication were \$140,000.00.

The major objective of the survey was to "describe quantitatively, and so far as practicable also in qualitative terms, the services, other than those provided through the private relationship between the patient and his pro-

fessional attendants, for the diagnosis and treatment of disease, and the cost of the complex public utility which has grown up for the organized care of the sick by institutions and agencies, whether voluntary, governmental or proprietary, in the defined area of and about the city of New York and serving its aggregate population".

The detailed report to the Survey Committee comprising the tabulations and analyses is contained in volumes 1 and 2. Volume 1 contains a summary of the findings and the recommendations presented in the technical volumes. The information on which the study was based relates to the years 1930 and 1934 as representative of critical phases of a period of economic disturbance. Descriptive analysis of the use of existing facilities and their cost together with a consideration of needs and plans for the future comprise the body of the text.

In volume 2 facilities for the organized care of the sick in the New York Metropolitan area are discussed under the following heads—hospitals, outpatient services, ambulance services, medical social service, care of the chronic sick, care of convalescent patients, nursing of the sick in their homes, medical care of the sick in their homes, and industrial medical services. Special studies were made of certain types of service—maternity care, care of the mentally ill, tuberculosis, venereal disease, heart disease, cancer, dental care and diabetes.

Volume 3 meets one of the major objectives of the survey. Here is presented for the first time the investment in and the cost of facilities for the care of the sick in New York City. This volume gives a financial expert's report on the economic structure of a social service comprising 814 units—representing a gross investment of approximately \$715,000,000.00 and annual expenditures in excess of \$109,000,000.00.

The twelve chapters in this book present a discussion of the problems which face all phases of the facilities for the organized care of the sick.

Volume 1 contains a summary of the report to the Survey Committee comprised in volumes 2 and 3. Here are brought together the essential findings presented in the detailed reports together with the major recommendations to be found in volumes 2 and 3.

As a source of information on the organized care of the sick and its community problems and as a source of reference in planning for the near and distant future these three companion documents will be of great value.

A. Hardisty Sellers

Fundamentals of Physical Examination. By George G. Deaver, M.D., B.P.E. Published by the W. B. Saunders Company, Philadelphia, 1939; Canadian Agents: McAinsh & Company Limited, Toronto. 292 pages, 126 illustrations. \$3.25.

THE responsibilities and medical privileges of the physical educator are limited to the "recognition of signs of disease and the use of standard tests for measuring". In the proper discharge of these functions, a knowledge of the meaning of medical terms is essential and a thorough working familiarity with test procedures is required. The objective of this book is to serve as a source of information to assist physical educators and students, public health and school nurses in being able to recognize the early manifestations of physical abnormalities as well as to acquaint them with the techniques and nomenclature employed by the physician.

As a source of information and as an aid in teaching the fundamentals of physical examination this book can reasonably serve a useful purpose.

F. O. Wishart

